THE IRON AGE

Established 1855 New York, August 28, 1913 *Vol. 92: No. 9*

Structural Steel Fabrication at Rankin, Pa.

General Features and Equipment of the Newer Part of the Plant Near Pittsburgh of the McClintic-Marshall Construction Company

A visit was recently paid to the works at Rankin, Pa., ar Pittsburgh, of the McClintic-Marshall Construction mpany, and an insight gained into the plant in general d the equipment in particular. When it is mentioned at the Rankin works include two shops, each with a pacity of 4000 tons of finished structural steel work for idges, buildings and other construction utilizing rolled terial, an idea f the scale of erations may obtained. The o main buildgs are each out 200 ft. ide, and nearly o ft. long, but together on the 3 acres of the te, which lies cross the Monngahela River rom the Homestead Works of he Carnegie teel Company, here is a total f 43 buildings, ncluding storage heds. The first uilding was rected about 901 and the secpid building was ompleted late in 905, but machines have been installed from time to time, and the present account will give some idea of the methods and facilities of the present time.

The main storage yard for the material received from the rolling mills occupies the bank of the Monongahela River, and this plain material then progresses through the shops which extend longitudinally away from the river, so that at the far end it is fabricated ready for shipment. There are in all 13 railroad sidings running through the works, some entering the finished ends of the shops for carrying away completed work. The conspicuous building besides the two shops mentioned is a large structure extending the full length of the shops and lying between them, housing the bolt and rivet making department, 90 ft. wide and over 200 ft. long; the machine shop where steel pins for bridges, cast-iron pedestals for structures and other machining work is done, this department being over 160 ft. long and 90 ft. wide; and a two-story pattern shop, 90 x 108 ft., where templates are made for unusual structural shapes like the curvilinear members common in theatre construction. The other large buildings of the plant include the power house, the ten good-size engines in which give an indication of the power requirements of the plant, and an attractive, commodious office building four stories in hight, with dining accommodations in the basement for office employees and company officials.

Fig. 1—Multiple Plate Punch, 60¼ In. Wide Between Housings, with a Capacity for Punching 30 Holes 13/16 In. in Diameter Through ½-In. Plates

The shops are noteworthy for their lofty interior, and though the main shops are 200 ft. wide, there is only a single line of interior columns extending down the center of the buildings at distances of 90 ft. and 100 ft. apart. There is an unusually large amount of narrow gauge tracking, of 2 ft. 6 in. measure, both in and around the shops. The river front storage yard is 920 ft. long, 200 ft. of which at one end is covered, and it is served by two parallel craneways, each of 70-ft. span. On one of the craneways is a 20-ton crane and a 7½-ton crane, each with its own operator, and on the parallel craneway is a 15-ton Morgan electric traveling crane, and there is also a jib crane with air hoist. The covered portion of the yard is provided with shears and other machines in a leanto, for rough cutting of various shapes.

As regards material handling in the shops themselves, a large number of relatively small lifting and transporting hoists is provided, as is to be expected. They are mentioned in some particular in the more detailed reference to shop No. 2, the later of the two main buildings, but in general there are numerous traveling hoists and cranes moving crosswise of the shop, and also pneumatic hoists, with the capacity increased by steps toward the

S. DIESCHER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

Fig. 2—Some of the Punches in Shop No. 2, Showing Guide Tables Leading to the Punches and the Movable Skids

farther end of the building, where the gradual assembling of the pieces gives greater weight to the parts handled. The arrangement provides for easily transporting crosswise of the shop the various pieces as they are sheared or punched, depending on roller tables leading to the main machines and on the narow-gauge system of cars for transporting the material longitudinally. The receiving yard, viewed from the covered portion and showing in the distance at the left, the loading derrick for water shipment is shown in Fig. 8.

Shop No. 2 is 480 ft. long and 200 ft. wide, except at the receiving yard end, where it is over 65 ft. wider, for a distance of 180 ft., forming a beam shop open with the shop proper. Here is done more particularly the punching, shearing and coping of heavy beams. On the opposite side of the shop from the beam department is space for punching and shearing plates, and in a line across the shop, between the plate department at the one end and the beam shop at the other, this line about 90 ft. inside the wall at the storage yard, are the punching and shearing machines for handling angles and the smaller channels and I-beams and narrow plates.

In the 90 ft. between the end wall and this line of machines, the material, sheared if need be to desired length, is piled on skids, some of them movable and others stationary, all of an I-beam top, supported by angle-iron legs of A-frame shape, stiffened. Leading to the machines for feeding the material to them are guide tables or roll tables, and a view of this department showing three of the machines is given in Fig. 2. This view shows at the left a rack punch of the multiple type, in the center a single punch, and at the right an angle multiple punch.

Beyond the line of machines for a distance of 90 ft. are skids for taking the material after passing through the machines, and this total distance of 180 ft. from the receiving yard wall comprises what may be called the punching and shearing department. A transverse narrow-gauge track with turn-table connections to the longitudinal lines of the same tracking marks definitely the beginning of the 300 ft. of the shop length given over to assembling, riveting and other operations.

The roll tables beyond the multiple punches are rigged for spacing purposes. A view of one of the spacing arrangements is given in Fig. 1, which also shows one of the especially noteworthy machines of the shop, one built by the Long & Alstatter Company, having a capacity for punching 30 holes 13/16 in. diameter through ½-in. plate, and being 60¾ in. wide between the housings. The pilot form of wheel used in connection with the spacing table is,

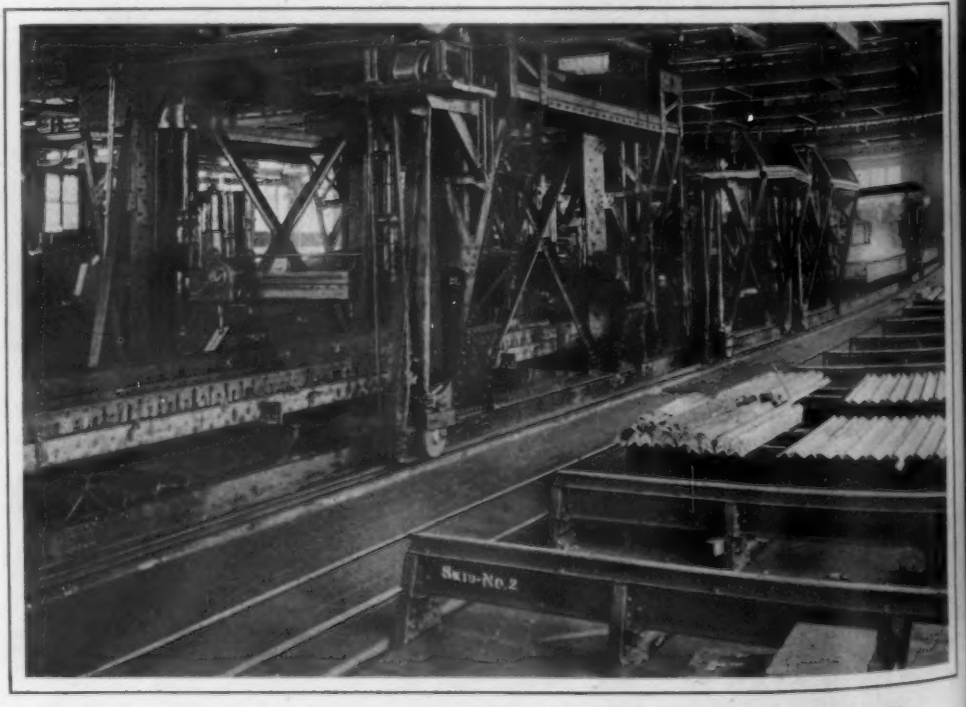


Fig. 3—Gantry Drills in the No. 2 Shop, Showing Also the Skids Resting in Slots in the Floor

Fig. 4—Double Rotary Planer in the No. 2 Shop on a Bed 116 ft. Long for Planing Girder Ends

f course, employed to give the leverage to the operator in harge, who is able to pull through the plate or pair of ngles, as the case may be, for the required distances etween holes, sometimes a wooden template marked off s to required distances being fixed under the traverse of he spacing table, and the pilot wheel being turned to ring the marker opposite each successive position in- icated on the template. Fingers or lugs indicated in the oreground of Fig. 1 may be fastended at the required istances on the spacing table and the punching of the oles at the desired distances may also be expedited accu- ately in this way. Incidentally Fig. 1 shows at the left in he background the plate-punching machine and at the ight a plate shear.

The overhead transporting arrangements in the punch- ng and shearing department are accommodated on the ower horizontal beams of the roof structure. These eams are 18 ft. apart on centers, and there are about even suspended horizontal traveling beam hoists, some f them with a 5-ton chain block and the remainder with two 2-ton chain blocks, all of these 62 ft. long and spanning three of the bays and movable transversely across the shop, like the rest of the overhead transporting devices, as already stated. There is also one or two of this type of carrier spanning, however, but one bay, and equipped with a 6½-ton air hoist. Most of the trans- porting is done by single air lifts, about 40 in number, most of these of 7½ tons capacity, but some of 6½ tons, hung from the bottom flanges of the roof beams. Over the delivery side of the line of machines are two 10-ton cranes, likewise travelling transversely across the shop, each of one span or 18 ft.

In the assembling department of shop No. 2 holes are drilled and reamed, as where punching is not allowed by the specifications under which the structural steel work is purchased. Conspicuous features of this department are two parallel ways, where large members like plate girders may be drilled and reamed by means of traveling gantry cranes. Along each side wall of this department are the main pneumatic riveters, 100 lb. pressure air being largely used.

Fig. 5—The Reamers in the No. 2 Shop, Showing the Hinged Arm, Carrying the Vertical Reaming Spindles

About 50 ft. in- side of each wall is the center line of one of the reaming gantry ways and the space between the riveting runway and the gantry runway is filled with skids where the material is either awaiting riveting or trans- portation, as the case may be. These skids are generally heavier than those found in the punching and shearing de- partment, having a rail fixed on top of the I-beam. On these also are stationed the com- plete girders for the painting proc- ess, for example, and generally

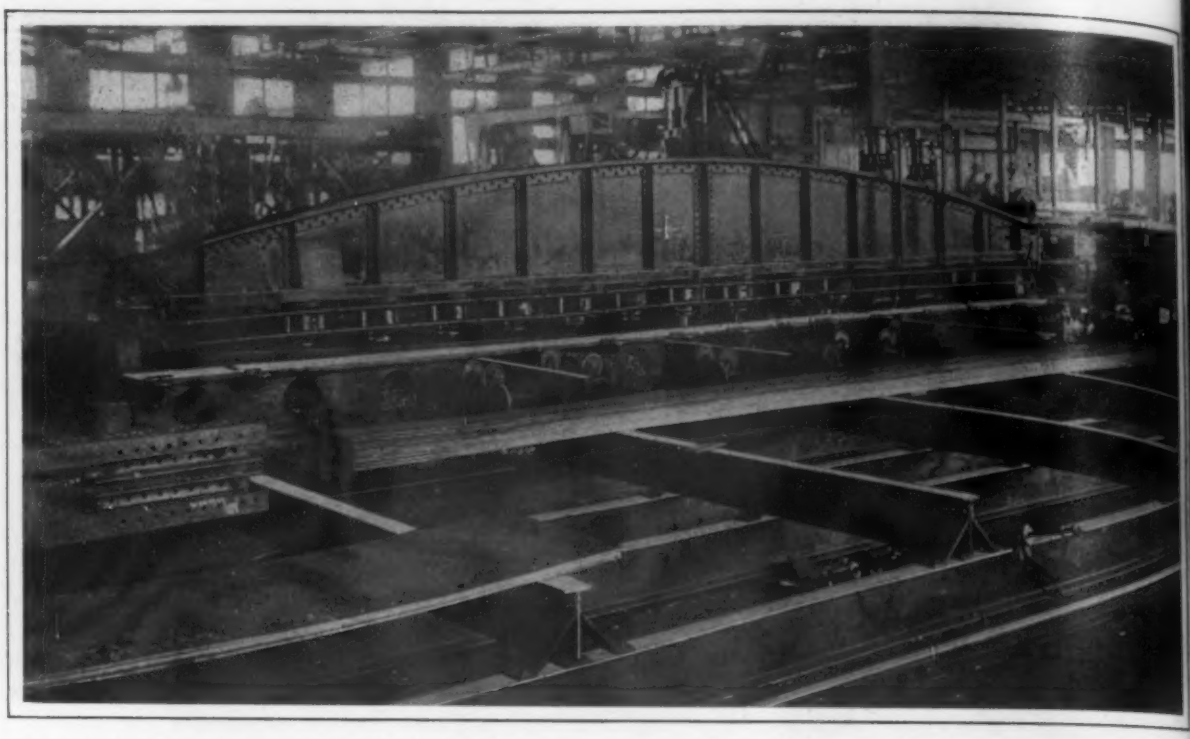


Fig. 6—Machine for Planing the Edges of Plates, Showing in the Foreground the Stationary Skids Between the Rails of the Movable Reaming Gantries

speaking, the completed material is carried across the shop toward one corner of the outgoing end, where there is a standard-gauge railroad track coming within the building and readily served by the most powerful cranes of the shop. Along both sides of each gantry runway is one of the narrow-gauge transportation tracks of the works, and the space between the two gantry runways is likewise generally occupied with skids for holding the material in process of fabrication. Here also is some of the special machinery which the McClintic-Marshall Construction Company provided to take care of the unusual work involved in manufacturing the large mitering gates installed in the locks of the Panama Canal.

One of the gantry runways does not run the full length of the building, but a part of the space is occupied by a Bement-Miles double rotary planer, a view of which is given in Fig. 4. One end of this machine is fixed in position, but the other end may be moved along its bed, so that, for example, a plate girder may have its two ends planed simultaneously, so long as it is not much over 100 ft. in length, the bed length of the double planer being 116 ft. over all. A single rotary planer of the same type is also installed, and, of course, can accommodate any length of plate girder, except, of course, that one end only may be finished at a time.

On the longer of the two gantry runways are four of the gantrys, and views of them are given in Figs. 3 and 5. Fig. 3 covers a boring gantry, while the other illustration shows the reaming gantries. In the boring gantry there is a Bickford drilling machine in each one of the four columns, and four men are employed to each gantry. As indicated in Fig. 5, each reaming spindle is mounted on a heavy hinge arrangement, one swiveling about each corner, so that with one setting of the material being drilled and reamed, any number and location of holes within the radius of each corner can be commanded, and with the

Fig. 7—View in the Rivet and Bolt Making Department Showing the Storage Bins Filled from Overhead Traveling Cranes

Fig. 8—Receiving Yard, Showing the River at the Left, Part of the Main Shops at the Right, from Which Tracks Extend Across the Yard

traveling feature of the gantry, holes may be drilled and reamed in an expeditious fashion. High-speed steel is used and 1400 holes have been drilled per day, or at the rate of about 50 per spindle per hour. The illustrations show the make-up of the gantry runway floor with its stationary skids. Fig. 3 also gives a view of the general form of the rail-topped skids in this department, together with the longitudinal slots or depressions in the floor in which they rest, so that they are movable in the one direction and are constrained against side movements.

Another one of the machines in this department is shown in Fig. 6, which is a Hillis & Jones machine for planing the sheared edges of plates. The holddowns for keeping the plates in position, while the cutting tool travels along the edges, are indicated. Another of the interesting installations in this shop, necessitated on account of the Panama Canal work, as stated, is comprised in two Newton vertical machines with milling attachments, erected accurately the proper distance apart, and at the proper angle to each other, so that at the one time opposite ends of the girders for the Panama Canal mitering gates could be planed.

Another of the interesting machines, shown in Fig. 10, is a Schulze & Naumann heavy duty beam shear bought some time ago from the Wiener Machinery Company, New York City. This is a closed type one-stroke machine to cut beams, channels and other shapes at one stroke, without the necessity of turning them over. The frame consists of two heavy steel plates, 2½ in. thick, and after a beam has been placed under the knives, the machine is thrown into gear and an upper knife punches out a narrow strip, going first to the left and then to the right of the beam. It is stated that a 24-in. 100-lb. beam may be cut in 20 sec. As tools for the machine do not have to be changed, it is found valuable in cutting material of different sizes and different shapes.

Fig. 9—Template Shop for Making Wood Patterns Full Size for Unusual Structural Members, a Room Conspicuous for Generous Glass Surface

The overhead transporting arrangement for the assembling department comprises hoists traveling transversely across the shop, 10, all told, of 5-ton capacity each, except for the outer half of the shop, where the built up sections become heavier and there are two 20-ton overhead electric traveling cranes on parallel runways on spans of about 21 ft. and then two 40-ton electric traveling cranes, also parallel to each other. In the case of handling unusually heavy material, the two 40-ton cranes are used together, and underneath both the 20-ton and the 40-ton canes are also 5-ton hoists. Above the riveting space on the shipping side of the shop is a trolley track for use in handling the heavy riveting machines. The

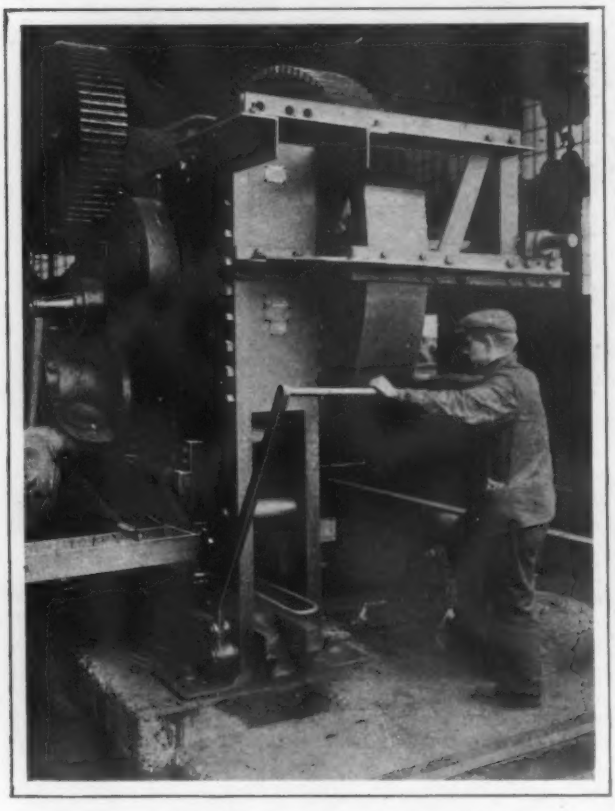


Fig. 10—A Schulze & Naumann Shear for 12 to 24-In. Beams

hoists are of a usual type in fabrication shops in that they comprise beams suspended from a point toward each end by lifting tackle and each has two trolleys traveling on the lower flanges of the I-beam.

Fig. 7 shows a view of one end of the bolt and rivet making shops. The machines and their adjacent furnaces are not clearly discernible in the picture, but the rivets as formed fall on a traveling metal table, which delivers to a bucket resting in a pit behind each machine. This is lifted by a traveling crane, and it is of bottom dumping type, so that when held above the proper storage bin, its contents may be readily dumped in at the top. The only handling, therefore, that the rivets get from the time the material is supplied to the rivet-making machinery to the time the rivets are removed from the hopper at the bottom of the bin, is the lifting by the overhead traveling crane. Rivets are also packed in kegs in this department for shipment to the site of the erection of a particular structure and the threading as well as making of bolts and tie rods is also done here.

The power house of the plant is interesting, and comprises an installation of gas engines, utilizing to a large extent the natural gas obtainable in the district. There are gas-engine electric units for supplying the electricity needed to drive the various motors about the plant, the machines all being of the individual drive, and also, of course, electricity for the electrically operated cranes; and there are gas-engine compressed-air units for supplying the compressed air needed in riveting and for air hoists.

At opposite ends of the power house, which is about 200 ft long, is a horizontal Snow gas engine, one at one end driving a Laidlaw-Dunn-Gordon two-stage tandem air compressor, and the other driving a 200-kw. Westinghouse direct-current generator, and in the space between are eight vertical Westinghouse gas engines, and also a two-stage Ingersoll-Rand air compressor, motor driven. Three of the Westinghouse engines, with 18 x 22-in. cylinders, drive two-stage Ingersoll-Rand compressors by means of belting. Two engines of the same size are direct connected to 200-kw. Westinghouse generators, giving current at 250 volts, and three of the engines, with 13 x 14-in. cylinders, drive 100-kw., 250-volt dynamos. The motor-driven air compressing unit is operated by two 150-hp. Westinghouse motors, mounted on the same shaft, and belt-connected to the air compressor. The power house has a hand-propelled traveling crane of about 45-ft. span, equipped with a rotary air hoist, and the power house has a cement floor and is built with brick walls, with a monitor roof.

Among other interesting features of the works may be mentioned a sand-blasting outfit of some size, located in one of the storage yards for sand-blasting completed structures, such as was required by some of the Government work for the Panama Canal. At one point in the yard, where the narrow-gauge tracking crosses the standard gauge tracking, an arrangement is provided for lifting a section of the narrow-gauge tracking bodily, including the wooden ties fixed to the rails, by means of a jib crane, the narrow-gauge tracking interfering with the use of the standard track except when removed.

Mesta Blowing Engines Shipped to Australia

The Mesta Machine Company, Pittsburgh, Pa., has just made a shipment of three large blowing engines which it built for the Broken Hill Proprietary Company, Ltd., Melbourne, Australia. The engines are of the vertical high-speed type and will be used in connection with the blast furnace plant that is being erected there. A brief description of this plan, which will make the first pig iron produced in Australia, appeared in *The Iron Age*, February 20, 1913.

As the engines will be operated by workmen who are inexperienced in handling machinery of this nature, they were made rugged, so that repairs would be reduced to a minimum. Two of the engines are for high-pressure and one for low-pressure work and all have steam cylinders 44 in. in diameter, with a 60-in. stroke, and 84-in. air cylinders. All of the air heads for these engines are equipped with the builder's plate valve manufactured under the Iverson patent, an illustrated description of which appeared in *The Iron Age*, May 29, 1913. Twenty-three cars were required to carry this shipment, which had a total weight of approximately 1,300,000 lb. It was hauled as a solid through train to New York by the Pennsylvania Railroad in 24 hr. from the time it left the company's yards at Pitcairn, Pa. From New York the shipment will be taken by the American-Australian line around Cape Horn, the total distance being about 8000 miles and requiring approximately 70 days to make the journey.

Canadian Iron Ore in 1912.—Shipments of iron ore from mines in Canada amounted in 1912 to 192,753 gross tons, against 187,807 tons in 1911, 231,623 tons in 1910, and 239,324 tons in 1909. These shipments do not include Newfoundland ore. In 1912 the imported iron ore consumed by Canadian blast furnaces amounted to 1,802,826 gross tons, as compared with 1,453,900 tons in 1911, 1,229,496 tons in 1910, and 1,102,679 tons consumed in 1909. Imported iron ore was obtained chiefly from the United States and Newfoundland. The exports of iron ore from Canada in 1912 amounted to 105,472 gross tons, as compared with 33,648 tons in 1911, 102,231 tons in 1910, and 19,604 tons in 1909.

Riggs, Distler & Stringer, Inc., engineers and contractors, 23-25 Light street, Baltimore, Md., have been awarded the contract to install a battery of 800 hp. water-tube boilers, with automatic stokers and extensive power plant additions, for the Springfield State Hospital; plumbing and heating contracts for the Eastern Shore State Hospital; plumbing and heating at the Maryland House of Correction, Jessups, Md.; power-plant changes at the Union Abattoir Company, Baltimore.

The Norton Surface Grinding Machine

An Open Side Planer Type with New Features—Tables Made Up to 14 ft. in Length

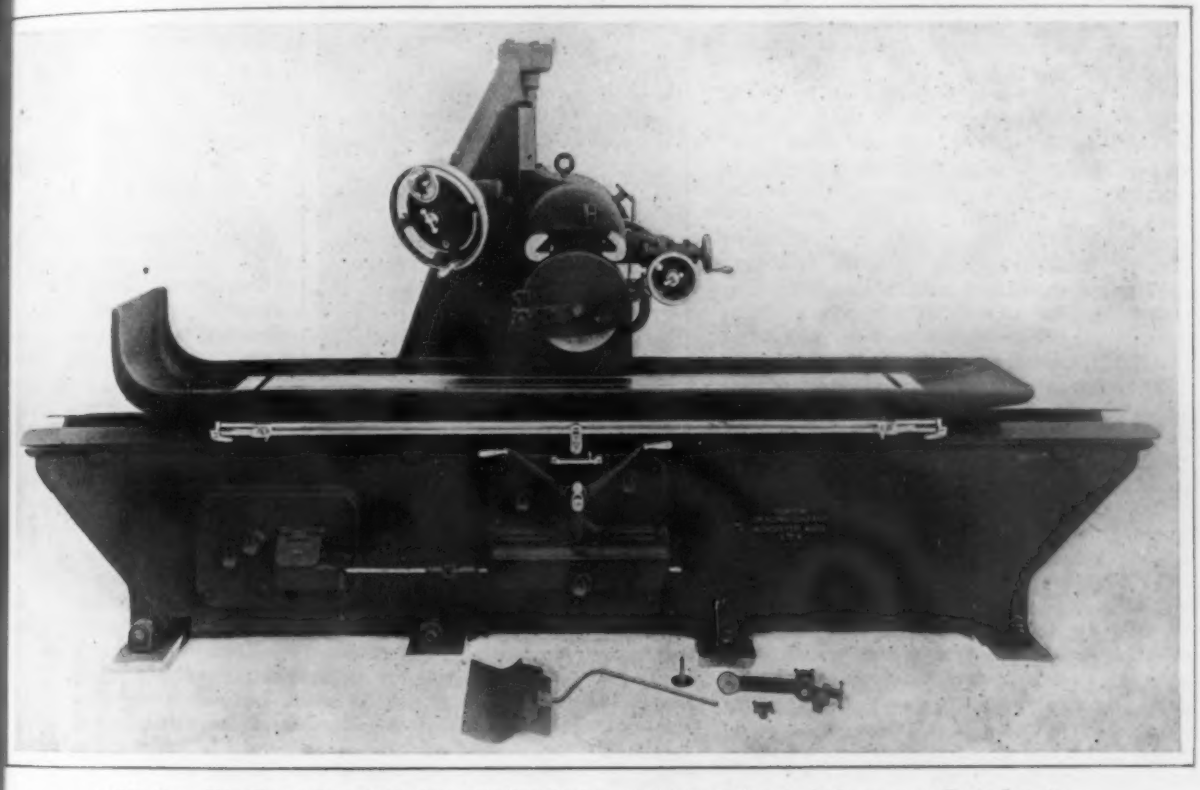
The Norton Grinding Company, Worcester, Mass., has brought out a new type of grinding machine for plane surfaces. The working surface of the table is 15 in. wide and 6, 8, 10, 12 and 14 ft. long, depending upon the size of the machine. The wheel head can be raised to give 7 in. between the table and a wheel 14 in. in diameter, which permits the use of a magnetic chuck or supplementary table.

The experience of the company has demonstrated that the smaller the arc of contact of a grinding wheel the greater its efficiency, especially when grinding plane surfaces, because the arc of contact is much greater than with round work. A wheel of small diameter is recommended for this reason, and the machine is designed to carry 14-in. wheels, with a 6-in. face for ordinary work, and other widths for special work, as required. For the same reason the periphery of the wheel is used and not the side, as with a ring wheel, on the ground that the latter gives no opportunity for the chips to escape, and that there is heating and undue power consumption. Too great an arc of contact, it is held, also gives these undesirable results. In this machine all overhead works are done away with, the countershaft being located in the base and receiving power through a belt from a 15-hp. motor on the side of the machine.

The grinding wheel is carried on a cross slide operating at right angles with the table travel. In order to secure the large production made possible by the use of the wide-face wheel no automatic feed of the wheel is provided, a hand traverse locating the wheel so as to utilize the full width. The slower traverse when truing the wheel face is obtained through worm gearing. The cross slide is carried on a vertical slide which is raised and lowered on the column by a ½-hp. motor through a lever and friction clutch. For small distances the vertical traverse is accomplished by a handwheel on a shaft geared to the vertical traverse screw, a micrometer index, graduated to 0.00025 in., permitting of delicate adjustments.

The table traverse is obtained by worm gearing which gives the perfectly smooth motion which is essential for the production of an accurate surface on the work. The reversal of the table is cushioned pneumatically at the end of each stroke. The table has T-slots of standard dimensions, which facilitates the strapping of work to the table or the application of a supplementary table, magnetic chuck or special fixtures. All kinds of plane surfaces within the capacity may be ground quickly and accurately, and the machine can be used also for grinding a wide variety of shapes by means of a special forming attachment.

Ball bearings are employed on all shafts operated by handwheels, and worm and wormwheel shafts are provided with ball thrust bearings, and all worm gearing runs in an oil bath. Worms and wheel spindle are made of chrome nickel vanadium steel, heat treated, and all shaft bearings are ground and run in self-oiling boxes. Special equipment is used in the scraping of the ways in the base, resulting in such accuracy of alignment that when the table has been ground in place, it presents a uniform surface, free from chatter marks. The company's inspection requires that a Brown & Sharpe straight edge the length of the finished table surface shall hold tissue papers 2 in. apart throughout its length at any angle on the table. The machine is supported on adjusting wedges resting on iron plates which are embedded in a concrete foundation, making it possible to effect realignment easily should occasion require. A large water tank is provided with a pump which will deliver 30 gal. of lubricant per min. on the wheel and work.



A New Open Side Planer Type of Surface Grinding Machine Which Is Built with Beds up to 14 Ft. in Length

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A Remarkable Immigration Movement.—Government returns for June show that 176,200 immigrants came into the United States in that month. This was exceeded in only one other month in the country's history—May, 1907, when the total was 184,000. In June, 1908, after the panic, only 31,900 aliens entered the country. In June, 1909, the number was 85,400, and in June, 1910, 105,000. Business slackened off and in June, 1911, the total was 71,000. Last year, in June, it rose to 92,400.

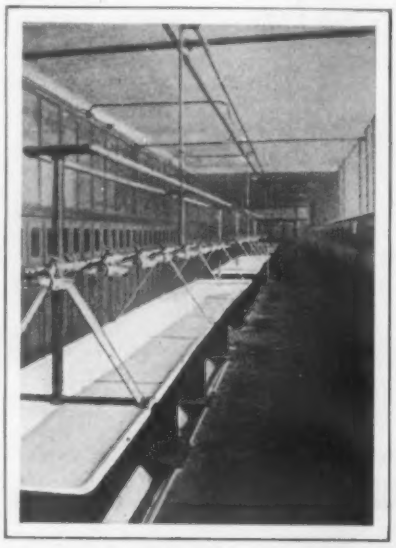
Gustav Rasmus, 2 Rector street, New York, has been appointed representative in the United States, Canada and Mexico for Joh. Kleinewefers Söhne, of Crefeld, Germany, and will handle the company's various lines of machinery. These include cold rolling mills and other equipment for rolling iron and steel, copper, brass, etc. The company designs and installs complete mills and also manufactures coinage and engraving machinery. Considerable of the company's equipment is now in use in the United States, but sales heretofore have been made direct from the Crefeld offices.

Plants of the German Machine Works

Some Features of the Manufacturing Side of the Deutsche Maschinenfabrik

The Deutsche Maschinenfabrik Aktien-Gesellschaft, which is also becoming widely known by its coined name, Demag, Ltd., has already made its impress on this country, and a few notes on the manufacturing side of the institution obtained during the recent visit to Germany of the representatives of the American Society of Mechanical Engineers will be of interest. While the German Machine Works has been conspicuous as the builder of some gigantic cranes, it has some seven chief departments, devoted to the following: Mine and quarry equipment, blast furnace plants, steel works, rolling mills, ship-building plants, harbor works and the equipment of shops, foundries, etc. The company also goes in for structural steel work and makes chains, anchors and forgings, and air compressors and builds compressed air plants.

The company was formed in 1910 by the amalgamation of three firms, one the Benrather Maschinenfabrik in Benrath, the Duisburger Maschinenbau-Aktiengesellschaft, in Duisburg, and the Märkische Maschinenbauanstalt in Wetter. The three works are not distant from one another, and are all in the Rhenish-Westphalian district. To give an idea of the size of the plant, it may be stated that the amount of business or turnover for the year 1912 was $10 000,000, and the total number of employees is over 6000. The works at Benrath have a total area of 20 acres, of which 51 per cent. is covered; the works at Duisburg have a total area of 17.5 acres, of which over 47 per cent. is covered, and the works at Wetter have a total area of 28½ acres, of which nearly 30 per cent. is covered. The main office of the company is located at Duisburg.



One of the Washing and Dressing Rooms

In a general way, it may be stated that with a few exceptions the company does not produce machines in a so-called series, but nearly always single machines are built for special purposes, and this has resulted in a technical staff that is much larger than the commercial staff. Besides some twenty-six drawing offices there is a staff of engineers engaged in working out proposals, traveling, etc. The scale of operations may be indicated by saying that an average of 1800 blue prints measuring about a yard square are produced daily. About one-third

Milk Kitchen for Workmen and Staff

of the total output of the company is sent outside of Germany, and the company states that for freight alone, it paid last year about $125,000.

As an item of the administration methods, mention may be made of the fact that the incoming correspondence is called for at the postoffice eight times a day. The letters, which are opened by means of an electrically driven letter opener, are at the same time stamped with the date and are numbered consecutively. They are then sorted by an experienced clerk, who has acquired a thorough knowledge of the whole firm by means of his long years of service, and distributed to the different departments and receipts collected for them. Each main department prepares a list of letters received in one day, which is made in manifold on specially printed forms with the help of the typewriter. The list contains: date and number of the letter, name of the sender and an abbreviated extract of the main contents of the letter. The original goes to the filing department, which pastes the lists coming in from all departments in books, so that it can be ascertained at any time if a certain letter had been received, what it contains and where it can be found. A second copy of the list of letters is sent to the managing director, and one or two copies are retained by the department concerned. The respective chiefs of the main department then distribute the letters against receipts to the subdepartments, where they are answered. Finally, mention may be made of the fact that foreign letters are first translated into German before they are sent to their respective departments. In this office are translated also all outgoing letters, so as to avoid as far as possible any mistakes in technical expressions.

If the contents of a letter concern more than one department, this is made known by the entry of the proper departmental signs in the space stamped on all the letters by the mail receiving clerk, and the letter is sent from department to department in the order prescribed by the signs until it is completely settled with. The whereabouts of a letter can always be traced from the receipt books which are kept by each department. The letters, after being fully dealt with, are provided with a mark illustrating this fact and are then forwarded to the filing department, where the copies of the outgoing letters are also collected.

In the publicity department, there is a literary office, one of the duties of which is to read carefully the 150 German and foreign technical journals received and to make short extracts of every article likely to interest any department. Copies of the extracts are sent around each week to all the chiefs of departments. In connection with this department, there is a library of about 5000 volumes. The advertising department, among other things, has to provide for models, for example, of large cranes, for exhibition purposes, inasmuch as the large cranes themselves cannot well be exhibited. The models are usually constructed to a scale of 1 to 50 or 1 to 25. The number of models which have been shown is sufficiently great for the company to have established its own department for making the models, and it has an exhibition room where models may be viewed by visitors.

The Benrath Works

The Benrath works are located about 6 miles from Düsseldorf, and here are made nearly all of the large traveling cranes and loading bridges, blast furnace plants, steel works buildings and the like. It has a bridge building shop over 1000 ft. long and nearly 150 ft. wide. It is traversed by two overhead traveling cranes of 65 ft. span, each crane having two lifts of 15-ton capacity, and the traveling speed of the cranes is 820 ft. per minute.

At one point of the works is a high crane runway, 130 ft. long and of 59 ft. span, for an overhead traveling crane of 25-ton capacity. The crane is equipped so that automatic grabs of all descriptions can be suspended and tested, and in addition tongs, stripper suspension gears, etc., may be attached to them. Below the crane several bunkers of coal and ore are sunk into the ground so that the capacity of the grabs can be tested not only with heaps but also when working in limited spaces. In the forge shop two of the steam boilers required for supplying steam for the forging presses, steam hammers and like, utilize the waste heat from re-heating furnaces.

The Duisburg Works

At the works at Duisburg, which are equipped with heavy machinery and produce the rolling mill and mining machinery, one interesting detail was noted with regard to the location of machines. All the larger machines with individual drives are, as a rule, placed on the window side of the shop, while the smaller machines, driven in groups of eight to ten, are placed in the center of the shop. By this arrangement daylight is not obstructed with transmission shafts.

In the hardening shop there are near the furnaces four troughs about 6¾ ft. deep and 32 in. wide for the hardening liquid, which is kept at a constant temperature by means of piping coils, cooled by water. The troughs are fitted with flaps and the fumes are drawn away by means of exhaust fans. The arrangement for hardening in quantities has been found satisfactory. The tool stores are placed nearby, as this spot lies in the center of the works, and is also near the smaller machines of large output which require the most tools. The workmen themselves are prohibited from sharpening tools, and only skilful workmen are employed for tool grinding. In addition to the general tool storage room, there is a tool room in each shop, and in these are also kept gauges and the like. For the high production machines, on account of the large quantities of cooling water required, a piping system has been installed, through which water is driven by means of a centrifugal pump, and the water used over and over again. The floor of the main shop was made by rolling the ground under a steam roller and then laying concrete to a depth of about 8 inches and covering this with about 1½ in. of asphalt tamped in place. It is found that with the considerable quantity of oil and grease present the asphalt has proved itself better than cement.

In the Duisburg works there is a large erecting shop, about 475 ft. long and 200 ft. wide. In the middle of the shop, which is equipped with a total of 10 cranes, is a craneway over 37 ft. high, accommodating two high-capacity cranes of 75 ft. span, and above this are two further craneways, built into the roof girders 59 ft. high and on which run two cranes of 10-ton capacity, and of 39 ft. span. When erecting high machinery, or when the heavier cranes are otherwise employed, pieces weighing 20 tons may be handled by working the two cranes last mentioned together. When the hight of 59 ft. is not sufficient, as when assembling large machinery, like hydraulic presses, use is made of a pit at the end of the middle span over 26 ft. deep and about 54 ft. square. The pit can be covered over at the top as well as at a depth of 16 ft by a frame of heavy girders.

The shop is also provided with a special bed plate 130 ft. long and 55 ft. wide, fitted all around with heavy machine tools, so that one large piece may be worked on by several machines at the same time. In addition, filing benches are made portable, and either a heavy bench with a vise is chosen, or a bench with six vises for a complete staff of fitters can be placed where required, and thus save the movement to and fro of large, heavy pieces.

The Wetter Works

The works at Wetter, principally making cranes for steel work and roll gears, are located in the valley of the River Ruhr. One of the machines in this shop, to which attention was called, is a rapid-working saw cutting through a channel shape about 12 in. high in 30 sec. It is found that the machine works so accurately that after removing the burr there is no further finishing of the cut necessary. The saw blade makes about 2000 r.p.m., and with full load requires 25 to 30 hp. The edge of the blade, which is of non-hardened steel, is provided with blunt, tooth-like projections, which, when coming in contact with the material to be cut, are said to cause the part being operated on to become hot and soft. It is felt that the real action of this saw is to melt through, rather than to cut but an overheating of the saw blade is prevented by water cooling.

Welfare for the Workmen

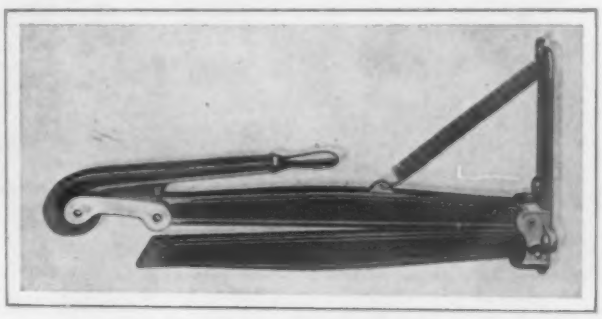
The provisions for the workmen are in part as follows: Near each workshop, according to the number of workmen employed, are provided dressing and washing rooms, fitted out with sprays and foot baths and also lockers. Each workshop is provided also with coffee and milk stalls. In the Duisburg works a milk kitchen is provided with special milk-cooling apparatus. Each dressing room is supplied with warming ovens for food, heated by gas in summer and by steam in winter. At meal time, dining rooms are placed at the disposal of workmen, where they may sit three or four persons together at small tables. Mineral water is supplied by the firm to the workmen at cost price to lessen as much as possible the use of alcoholic beverages.

At both the Wetter and Benrath plants, a building society has been established by the company to provide a colony of houses, which are kept in condition by an annual renovation, and they are surrounded by gardens. On account of the size of Duisburg no such arrangement has been made for employees' dwellings. The office and technical forces are provided for by a staff benevolent fund, in addition to which the firm has added a further support through the aged and invalid act and the new employees' insurance which has come into force, the last costing the firm about $25,000 per year.

The agents in New York City for Demag, Ltd., the Deutsche Maschinenfabrik A-G., are Neumeyer & Dimond, 82 Beaver street, New York, and the Wiener Machinery Company, Ltd., 50 Church street, the latter being agent for cold rolling mills.

A Machine for Seaming Sheet Metal Work

Elimination of hammering or malleting of the joints to make a perfect one on stove pipe is the feature claimed by Hemp & Co., Vandeventer and Shaw avenues, St. Louis,



A New Machine for Closing the Seams on Stove and Furnace Pipe and Sheet Metal Articles.

Mo., for their stove pipe machine. The machine is intended to close the seam and to groove nested stove pipe, and is also adapted for putting together all ordinary gauges and sizes of stove pipe, including taper joints, as well as closing the seams on furnace pipe and other sheet metal articles. The machine can be attached to a post, a wall or a bench. The operation of closing the seam is accomplished by placing the pipe, which has been previously rounded up and folded in the customary way, upon the lower bar. This has a holder to steady the pipe and the lever is then lowered, thus automatically closing the seam. The raising of the lever preparatory to removing the pipe automatically sets the machine for the next joint.

An Omission.—In an article in *The Iron Age*, August 7, relating to the gravity and power conveyor system recently installed in the plant of the National-Acme Mfg. Company, Cleveland, Ohio, it was erroneously stated that the entire new conveyor equipment was designed and installed by the Alvey-Ferguson Company, Cincinnati, Ohio. The endless chain elevator and the gravity section of the conveyor that passes through the bridge from the manufacturing department to the assorting room were, however, designed and installed by the Mathews Gravity Carrier Company, Ellwood City, Pa. This is an important part of the complete equipment and the National-Acme Company states that it is working in a very satisfactory manner. The remainder of the equipment described, including the helical gravity carrier, was installed by the Alvey-Ferguson Company, as stated.

The St. Louis Iron & Steel Company, St. Louis, has been incorporated with a capital stock of $3,500,000 by Warren B. Wilson, Harris Trust Building, Chicago, and Norman P. Coffin, William J. Maloney and Oscar J. Reichard, to equip a large iron and steel plant.

A Manufacturing Roll-Grinding Machine

Traversing the Grinding Wheel Carriage a Feature of the New Landis Product

A self-contained manufacturing grinding machine has been placed on the market by the Landis Tool Company, Waynesboro, Pa. Although the machine is intended primarily for the finishing of hardened steel and chilled rolls by the grinding process, it can be used for grinding a variety of other cylindrical work, such as large shafts, pistons, plungers, printing press rolls, etc. No overhead countershaft is used except when it is desired to drive from a lineshaft. Under these circumstances, an auxiliary shaft with tight and loose pulleys and a cone pulley for belting to the machine are required. Emphasis is laid upon the fact that with this arrangement it is possible to place the machine under a crane for lifting the work in and out, and no overhead obstructions to the passage of the crane are offered. The construction of the machine embodies the builder's distinguishing principle of traversing the grinding wheel carriage, which is a fixed weight. Views

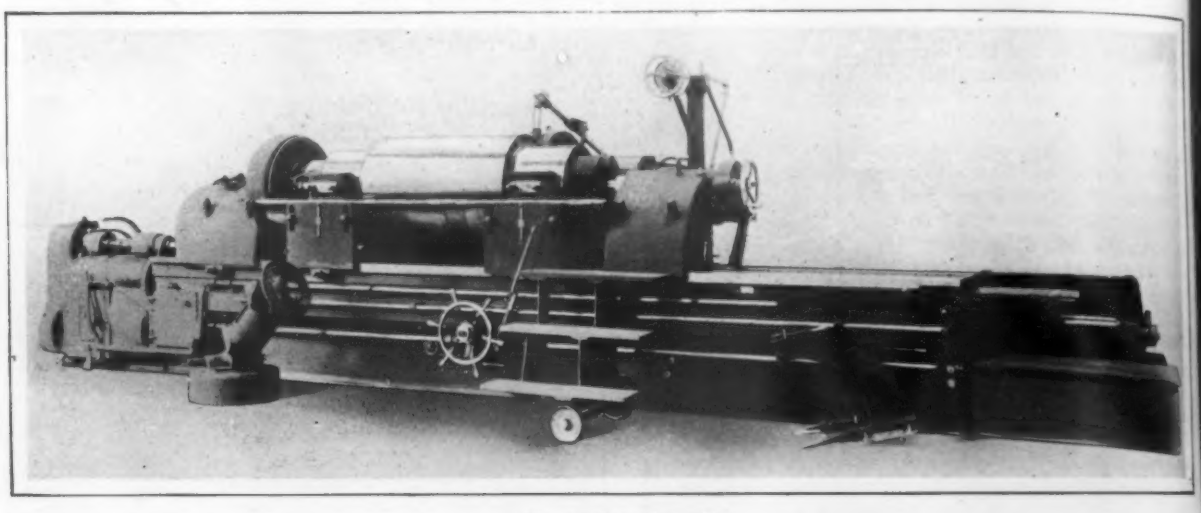


Fig. 1—Operating Side

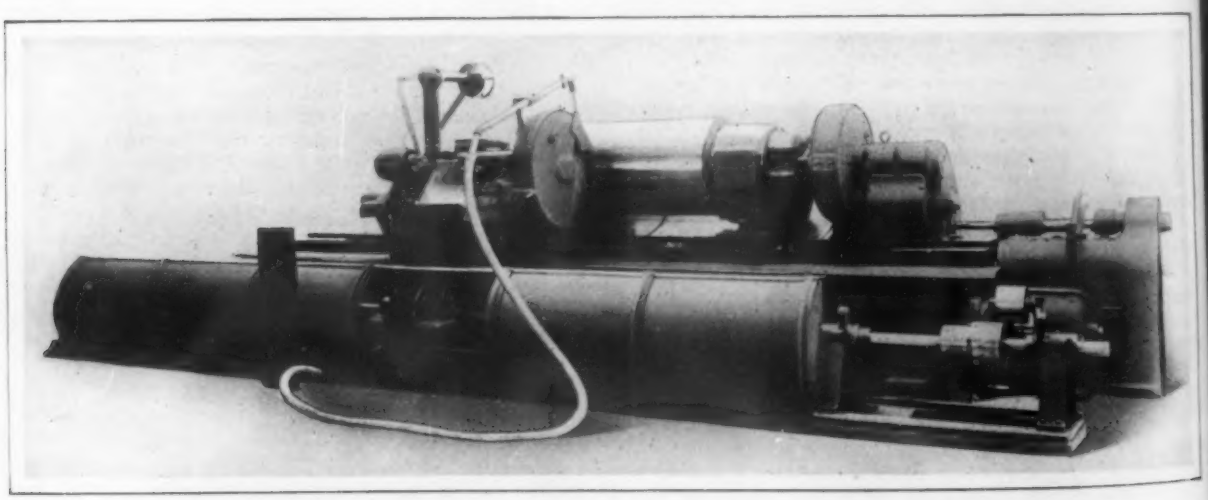


Fig. 2—Rear or Driving Side

TWO VIEWS OF A NEW ROLL-GRINDING MACHINE IN WHICH THE GRINDING WHEEL CARRIAGE TRAVERSES

of the front or operating and the rear or driving side are given in Figs. 1 and 2, while Fig. 3 is an end view, showing the relative positions of the grinding wheel and the work and the manner in which both are mounted.

The main drive is located in the rear of the machine, as shown in Fig. 2, and consists of a shaft extending the full length of the bed. From this shaft the different mechanisms are independently driven through belts, while it is protected throughout its entire length by a sheet metal guard. The grinding wheel driving pulley traverses with the wheel carriage, the advantages claimed for this arrangement being that an unvaried duty is imposed upon the carriage driving mechanism, a rigid and stationary foundation is provided for the work, and there is no overhanging of the work table. This pulley is trunnioned in an independent carriage which travels on a track formed on the base of the main drive. The pulley is driven by having rollers in its hub engage with step grooves in the main drive shaft, an arrangement which is relied on to give a practically frictionless driving connection.

The grinding wheel belt passes over idler pulleys, arranged so that the belt length does not change as the wheel head is moved on the cross slide. One of the pulleys automatically adjusts itself to any change in the length of the belt as it stretches and at the same time keeps it under a uniform tension.

The headstock is of heavy construction throughout and the work is driven by a powerful gear train. Any one of the sixteen speed changes can be secured by an arrangement of levers at the front of the machine. The footstock spindle is operated by a handwheel which is geared to a screw, so that the center can be run into the work easily with the heaviest piece in place that the machine will take.

The grinding wheel head is massive and rigid and is mounted on a V and flat guide of ample proportions, as shown in Fig. 3. In this way, it is emphasized, a smooth and positive action is secured when feeding for the lightest cut on the work. The spindle, which is 4½ in. in diameter, is made of heat-treated steel and runs in bronze bearings, having a taper adjustment for taking up wear. The bearings have a ball and socket connection with the base, thus making it easy to keep them in line with the spindle. Both automatic and hand feeds are provided for bringing the grinding wheel to the work, and in addition there is a rapid power feed for moving the wheel back out of the way when work is being changed and also for bringing it forward to the grinding position. This device is entirely independent from the regular feeds, and is operated by a lever and clutch arrangement. The automatic cross feed to the grinding wheel operates at each reversal of the wheel carriage, and can be set so as to reduce the diameter

f the work from 0.00025 to 0.012 in. per reversal. The ork and traverse speeds are varied and operated inde-ndently of each other, thus giving the necessary traverse ed for any speed of work. For grinding tapers the ble swivels and has two scales, graduated in degrees and ches per foot.

Three grinding wheel truing fixtures are provided. ne of these is mounted permanently on the footstock in convenient position for dressing the wheel when grinding e necks of the rolls. Another fixture is located on one f the bearings which carries the roll by the necks when e face is being ground, while the third fixture, which is ttached to the table of the machine, is used for forming r rounding the corners of the wheel for grinding the llets of the necks.

The bearings for carrying the rolls by their necks when

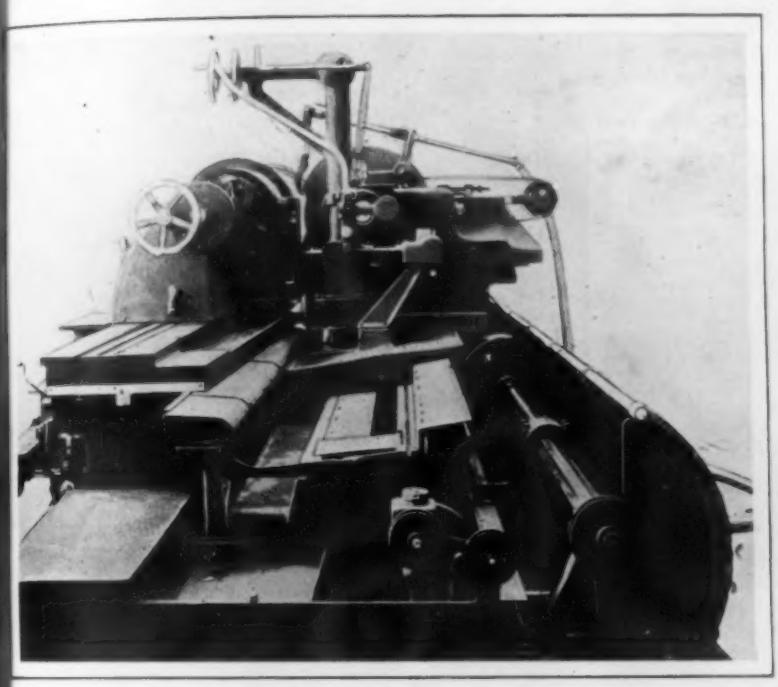


Fig. 3.—An End View of the Machine Showing the Relative Positions of the Grinding Wheel and the Work and the Manner in Which They are Mounted

grinding the body have three-point bearings which are adjustable for the variation in the size of the necks by wear and regrinding and also can be removed and replaced quickly with others for the different sizes of rolls. For concave grinding, special bearings are required, which have vertical adjustments for tipping the roll to an angular position, with one end above and the other below the horizontal center line of the wheel, which causes a concave form to be ground. Graduated scales indicate the vertical adjustment, which is made by screws. These bearings can also be used for grinding straight rolls, and the arrangement of the bearing heads is the same in this case. A universal driver for the work forms a part of the concaving outfit.

The machine is built in three groups of four sizes each. The maximum lengths of work handled by the four machines in each group are 10, 12, 14 and 20 ft., respectively, while the maximum diameters for the groups are 30, 40 and 52 in., respectively.

Electric motor drive is used, the motor being mounted on an extension of the main drive base and connected directly to the driving shaft or through a belt, as may be desired. The motor can also be placed on the ceiling or the side wall, and the power transmitted through a belt, in which case the base on the machine for the motor is not needed.

A new alloy, called elianite, is prepared in the electric furnace and is particularly resistant to acids, not being attacked by free chlorine or bromine or by hydrochloric, nitric or sulphuric acid or aqua regia. Its specific gravity is 6.8 and melting point 1250 deg. C. Its heat conductivity is good and its resistance to corrosion is 1000 times that of cast iron.

Status of Canadian Iron and Steel Works

The Bureau of Statistics of the American Iron and Steel Institute reports that in 1912 there were in Canada 21 rolling mills and 10 plants which made steel ingots or castings, but not finished forms of rolled iron or steel. Four rolling mills and steel works were idle, one in Quebec and three in Ontario. Six of the rolling mills and steel works active in 1912 are located in Nova Scotia, eight in Quebec, 13 in Ontario and one each in Alberta, Manitoba, New Brunswick and British Columbia. In 1912 four new steel casting plants were built—two in Ontario and two in Quebec. None of these plants is equipped with hot trains or rolls. On December 31, 1912, a plant was being built at Redcliff in the province of Alberta for the manufacture of merchant bars.

Canada had 20 completed blast furnaces on June 30, 1913, of which 13 were in blast and seven were idle. Of the total, 16 furnaces used coke for fuel and four used charcoal. Two furnaces, one charcoal and one coke, were being built on June 30. In the first half of this year two plants made ferrosilicon and ferrophosphorus in electric furnaces.

The Dominion Iron & Steel Company, Ltd., Sydney, Cape Breton, Nova Scotia, completed a new furnace this year, which was blown in on May 22. It has an annual capacity of 91,250 tons of basic pig iron. Of two blast furnaces being built on June 30, one will be operated by the Canadian Furnace Company, Ltd., at Port Colborne, Ont. It will have an annual capacity of about 125,000 gross tons. Lake Superior ore and Connellsville coke will be used. It is almost ready to blow in. The Standard Iron Company, Ltd., Montreal, is building a charcoal furnace at Parry Sound, Ont., annual capacity about 36,000 gross tons. It is practically complete. Hematite and magnetite ore from Michigan and Ontario will be used.

The annual capacity of the 20 completed Canadian blast furnaces on June 30, 1913, was 1,391,550 gross tons, and of the two furnaces building was 161,000 tons, a total of 1,552,550 tons. The capacity of the completed coke furnaces was 1,354,750 tons and the capacity of the completed charcoal furnaces 36,800 tons. The capacity of the coke furnace in process of building was 125,000 tons and of the uncompleted charcoal furnace 36,000 tons.

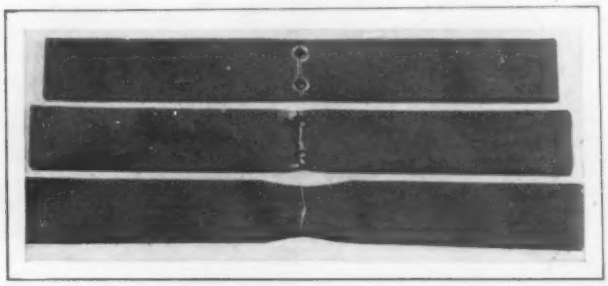
A New Refractory.—Boron nitride, a new refractory material, has been patented in the United States by E. Weintraub. It is infusible at the highest heat of the electric arc and is also chemically inert. Its resistance to the passage of an electric current, even at the temperature of the carbon arc, is extremely high. Carbon is the only other substance resembling it in such properties. Unlike carbon, however, it has no chemical tendency to unite with other materials which are likely to be used as a charge in an electric furnace. When properly divided, no binder is necessary and the purity of the material may be preserved when making all kinds of containers. It can be prepared by any one of the methods recommended in chemical technology.

The Atlas Car & Mfg. Company, Cleveland, Ohio, builder of industrial cars and locomotives, has completed the removal of its entire plant to its new quarters on Ivanhoe road, East Cleveland. The new building is of steel construction, about 100 x 400 ft., and gives the company a considerable increase over its present capacity. For the present the offices will remain at the old site on Marquette avenue, but it is the intention to build in the near future an office building adjoining the new plant.

Drilled Holes in Structural Steel

Elastic Limit and Resistance to Breaking Higher After Drilling—Effects of Punching

In Le Genie Civil for July 19, 1913, C. Birault, chief of the department of testing materials of l'Ecole Centrale, Paris, discusses the effect on the elastic limit and tensile strength of drilling and punching holes in structural steel. Mild rolled steel, such as is usually employed in building construction, was cut up into bars and used in the experiments. The author claims to have established the fact that the resistance to rupture of solid bars and perforated bars of the same metal is not proportional to the section of the bars, proper allowance being made for the perforations. Section for section the advantage is in favor of the perforated bars if the holes have been drilled and not punched. In fact, the holes weaken the steel much less than would be expected, provided care is taken to drill the holes or to ream them after they have been punched. The elastic limit and the resistance to breaking are then



One Set of Physical Tests Showing Effect of Drilled and Punched Holes

higher than before the drilling. Certain facts which the experiments have established furnish a satisfactory explanation of this.

In the first series of experiments three bars were cut from one piece of steel. One bar was pulled in its original condition; the second bar was perforated with two holes by drilling, located on the small axis of the bar, and the third bar was perforated similarly, except that the holes were punched. The holes in each case were of 15 mm. diameter and spaced at a distance of three diameters from center to center. The bars were pulled on a 300-ton testing machine. Several sets of such tests were made. The illustration shows a series of the three kinds of bars pulled from the same steel. The fractured ends are placed in contact. It is readily seen that the plain bar has elongated much further than the other two, since the molecular fatigue is less localized than in the perforated bars. The bar with the drilled holes, the middle one, has elongated further than the one with the punched holes, and in it the holes have become decidedly oval, which is not true of the punched holes. The comparison of the two perforated bars suffices to show how the drilling or the punching of holes modifies or ameliorates the properties of resistance of mild steel. It is also seen that the fracture of the punched bar has not taken place along the diameter of the holes. This is probably due to the fissures in the metal caused by the action of the punch. It is quite the contrary in the case of the drilled holes, which have parted at their central diameters. The numerical results also support the evidence in favor of drilled holes, showing also an increase in the elastic limit and tensile strength of mild steel. The results of three sets of tests are given as follows:

Set from first bar	Elastic limit, kg.	Tensile strength, kg.
Plain bar	24.4	39.2
Bar with drilled holes	31.4	43.5
Bar with punched holes	33.4	37.6

Set from second bar	Elastic limit, kg.	Tensile strength, kg.
Plain bar	23.4	37.9
Bar with drilled holes	29.3	43.3
Bar with punched holes	31.3	39.5

Set from third bar	Elastic limit, kg.	Tensile strength, kg.
Plain bar	25.7	46.1
Bar with drilled holes	29.4	49.4
Bar with punched holes	34.4	34.8

It will be noticed that in each case the elastic limit is higher in the bars having perforations than in the plain bars, with the increase in favor of the punched holes over the drilled, while in the tensile strength there is an increase for the bar with the drilled holes over the plain bars, the bars having punched holes losing decidedly in strength as compared with the plain. Averaging the results in terms of percentage, the bars with drilled holes have 12.3 per cent. greater average elastic limit and 9.2 per cent. greater average tensile strength than plain bars of the same steel. In the case of the punched bars there has been an average increase of 13.5 per cent. in elastic limit and an average decrease of 8 per cent. in the tensile strength as compared with the plain bars of the same steel.

In the second general series of tests, bars were perforated with drilled holes of various diameters to determine the effect on the physical properties of the steel compared with plain bars of the same steel. Holes of 11, 8 and 6 mm. diameter were drilled in various sets of bars and then tested as a comparison against the plain steel. The results were as follows:

	Elastic limit, kg.	Tensile strength, kg.
Plain bar	28.9	45.2
Bar with drilled holes of 11 mm.	32.3	50.4
Bar with drilled holes of 8 mm.	32.0	48.7
Bar with drilled holes of 6 mm.	33.7	53.0

It is evident from these that the two physical properties are higher in the case of the smallest holes, but not regularly so. Taking the holes of 11 and 6 mm. diameter, the increases in percentage over the plain bars are:

	Elastic limit, per cent. increase	Tensile strength, per cent. increase
Holes of 11 mm. diameter	11.8	11.5
Holes of 6 mm. diameter	16.6	17.3

It will be noticed that the increases in the first series of tests where the holes were 15 mm. in diameter were about the same as those of the second series with holes of 11 and 8 mm. diameter. But in the case of the smallest holes, those of 6 mm. diameter, these increases are remarkably higher, having attained 17 per cent. over the plain bars.

Answering in general the question why there are such increases in the physical properties of bars with drilled holes over the plain bars, the author states that in bringing into contact the fractured ends of the plain bar it is found that the two parts are not complementary; that is, that there is a hollow space near the center where the metal has evidently drawn away first, the break then proceeding gradually to the two sides. If, however, the metal is perforated with holes that are smooth, as in drilled holes, and not having fissures as in punched ones, this tendency of the metal to separate and weaken is removed and the mean resistance to rupture is more uniform.

The results of these tests show that insistence cannot be too strong on the practical importance of at least reaming out the holes that are punched in mild steel. This is too often neglected for economical reasons. Some of the results show that the breaking is often very close to the elastic limit of the steel. Quite the contrary is true in the case of drilled holes.

New Heat-Treatment Plant at Altoona

The Pennsylvania Railroad has erected a new heat-treating plant at its shops in Altoona. It has been located in No. 2 blacksmith shop at the Juniata works and will consist of several large furnaces for heating the steel parts and a large tank of water for cooling. One of the new furnaces will be vertical, having a hight of 16 ft., with inside and outside diameters of 6 ft. and 8 ft. 2 in., respectively. Another one of the larger furnaces will have a heating chamber 7 ft. wide, 14 ft. long and 2 ft. 6 in. high. This furnace will open at the bottom, its floor being separate and mounted on wheels; thus what is virtually a flat car, with steel trucks and underframe and a fire brick floor, will form the bottom of the furnace. This car can be loaded with parts to be treated and then pushed into the furnace on a track provided for the purpose. One of the smaller furnaces will have a heating chamber 4 ft. x 7 ft. x 18 in. high. These are to be used for experimental purposes and for small locomotive parts. The furnaces will burn crude oil, the same as is now being used in a great many of the furnaces throughout the shops. The water tank will be 14 ft. x 13 ft. 9 in. x 20 ft. deep and open at the top. A 12½-ton crane runs over it, as well as over the furnaces. This will facilitate the handling of the parts in moving them from the furnace to the tank and back again.

A Special Lathe for Turning Tapers

A Whitcomb-Blaisdell Machine with Taper Bed Swiveling from the Head End

The Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass., has brought out a new type of taper turning lathe, possessing several original features. The most conspicuous of these are the mechanical method for setting the machine for tapers and the fixed end feed works.

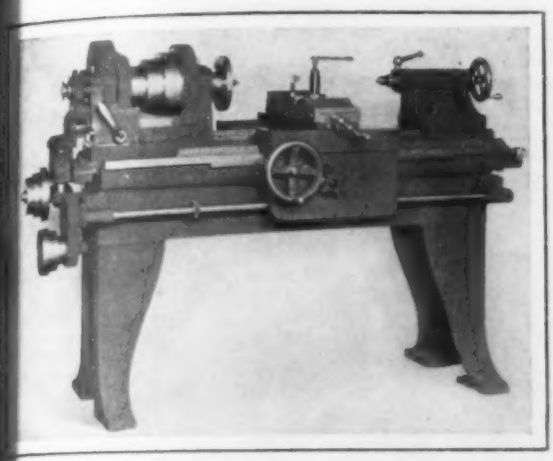


Fig. 1.—The Whitcomb-Blaisdell 14-In. Special Turning Lathe

Tapers may be turned up to 1 3/5 in. to the foot on a 5-ft. bed. The lathe is rated as a 14-in. machine and swings 16¾ in. over the bed and 10¼ in. over the carriage. Fig. 1 is a general view of the new lathe, while details of the headstock and tailstock ends are given in Figs. 2 and 3, respectively.

The method of setting the lathe to turn tapers affords a high degree of rigidity. There are two beds, one within the other, the outer being that ordinarily used on the company's 16-in. machine giving very large bearings, which tend to give a long life of accurate production. The inner bed is accurately fitted to the outer, upon which it rests, as shown in Fig. 3, the two surfaces being scraped to a bearing, on the broad surfaces at the end and on the generously wide cross-tie at the center.

The inner bed pivots at the head end of the machine on a swivel stud at the left of Fig. 2, an arrangement which permits of great accuracy of work. At the tail end of the outer bed are a number of holes that take the adjusting screw plugs which give the approximate taper, while the final setting is obtained by the screws. After adjustment is secured, the bed is clamped in place by binder bolts, both at the head and tail. Because of the swiveling from the head of the lathe the end feed works remain fixed, no matter what the taper may be, with a fixed distance between the two cones of the feed drive, and consequently the usual necessity of lengthening or shortening the feed belt does not exist. The swivel stud is drilled out to carry the vertical shaft which drives the feed from a bevel gear at the top through a spiral gear which engages a similar gear on the pulley. The machine is furnished with belt feed, as shown, or with all gear feed, so arranged that three changes are obtained without substitution of gears.

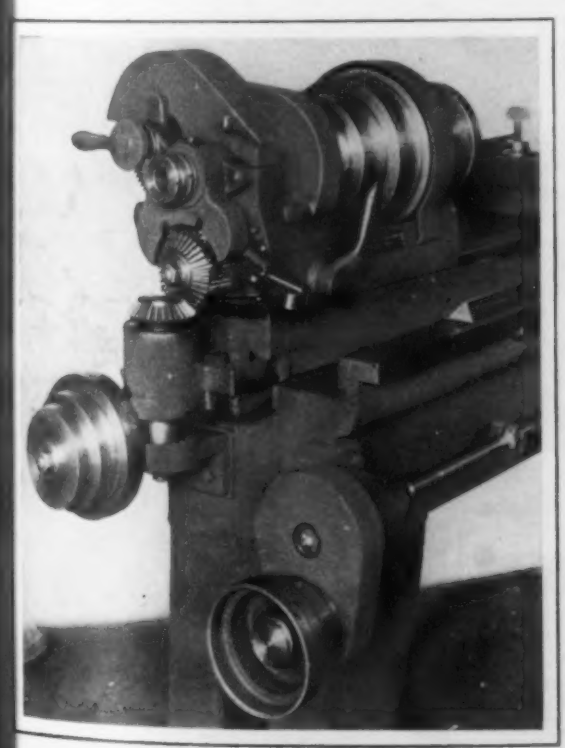


Fig. 2.—The Headstock of the Special Turning Lathe Showing the Swivel Stud and the Feed Drive

The massive carriage has long bearings on the ways, and a bridge 6 in. in widtn. It is equipped with the new form of rise and fall rest, which removes the necessity for a double carriage, or with plain gibbed block. On the cross feed is a large micrometer adjustment. An automatic stop for the feed is provided. The machine has device for tightening the main driving belt. It is furnished either with a three-step cone pulley and double back gears, or with a special single pulley drive, all-geared head.

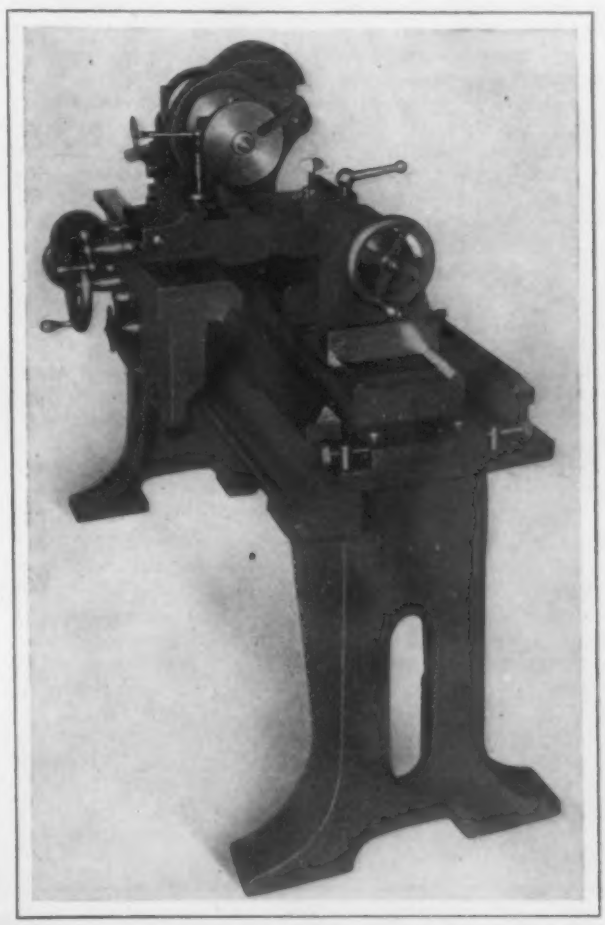


Fig. 3.—View of the Lathe from the Tailstock End Showing the Two Beds and Adjusting Screw Plugs

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Natural Gas in New Brunswick.—The St. John Board of Trade, St. John, New Brunswick, says: "Those who believe that natural gas is to play an important part in the industrial development of New Brunswick were confirmed in that belief last week when the Maritime Oil Fields, Ltd., struck a new well with a yield of nearly 4,000,000 cu. ft. per day. The pressure was so great that it was with considerable difficulty the workmen were able to cap the well. It is claimed that the pressure in these Albert County wells is greater than in any other gas wells in Canada. Moncton is now supplied from these wells, but as yet only requires 1,000,000 cu. ft. per day, and, as the number of wells is increasing, the quantity of gas that is available for all purposes steadily grows."

A New Surface Grinding Machine

Details of the Recently Developed Pratt & Whitney 22-In. Vertical Machine

The unusual results obtained from the small vertical surface grinding machine which was mentioned in *The Iron Age*, December 30, 1909, has led the Pratt & Whitney Company, Hartford, Conn., to develop a 22-in. vertical surface grinding machine. This machine is designed to handle either plain or circular grinding. In general construction the machine is the same as its smaller forerunner, although, of course, the various parts are much larger. Front and rear views of the new machine are given in Figs. 1 and 2, respectively, while the arrangement of the mechanism for varying the table and grinding wheel feeds is shown in Fig. 3. Fig. 4 is a detail of the grinding wheel and a double magnetic chuck.

The bed has wide bearing surfaces of the V and flat type, oil reservoirs being located in the bed for oiling the ways by rolls. A pan of liberal proportions, which is easily accessible for cleaning, surrounds the rear of the bed for collecting the water and receiving the chips. Either 4 or 7 ft. tables can be regularly finished for the machine, the bed being made in two sizes to accommodate them. Guards are provided for the table, which protect the bearing surfaces from injury, and a spacious pan is cast integral with the table for controlling the water and the chips.

The upright is bolted solidly to the bed, wide bearing surfaces being provided for the accommodation of the head. A taper gib forms a part of the construction and is used to maintain the proper relation between the head and the upright bearings. Wipers and guards are also employed to protect the bearing surfaces. The spindle is made of special steel and is furnished with ball bearings throughout. The driving pulley is mounted upon ball bearings, independent of the spindle, an arrangement which it is emphasized absorbs the belt pull and prevents it from being transmitted to the spindle. Another advantage of this construction is that the driving belt is located in a protected position where it is not reached by the water spray.

The table has automatic reciprocating motion, any desired length of stroke being readily obtainable by a set of adjustable dogs. The table is driven through a vertically located rack and pinion, and this construction is relied upon to eliminate the possibility of vibrations showing in the finished work. The feed mechanism is contained in one compact unit and two table feeds are provided, both of which can be instantly controlled through the lever A, Fig. 3. When moved to the right, the slow feed is engaged, while motion in the opposite direction engages the fast feed in a similar manner. In the central position, this lever serves as a means for stopping the table. In addition to the two rates of feed, the table has power quick return for use in connection with rotary chucks. To engage the power quick return the lever B is moved to the lower position. It will be noticed, however, that this lever is locked by the lock bolt C, and cannot be operated while the regular feed is engaged. To unlock the lever B, it is necessary that the regular feed lever A be in the neutral position, after which the lock bolt C may be adjusted to its outward position, thus releasing the lever B and locking the lever A. In this way, it is impossible for the regular and quick return feeds to be engaged at the same time. After the quick return mechanism has become operative, it is controlled through the lever D.

In addition to the rapid hand feed, the wheel has both hand and power feeds. The vertical adjustment of the wheel is sensitive, the head being counterbalanced and controlled accurately through the feed mechanism. The power feed is operated through a ratchet wheel and pawl,

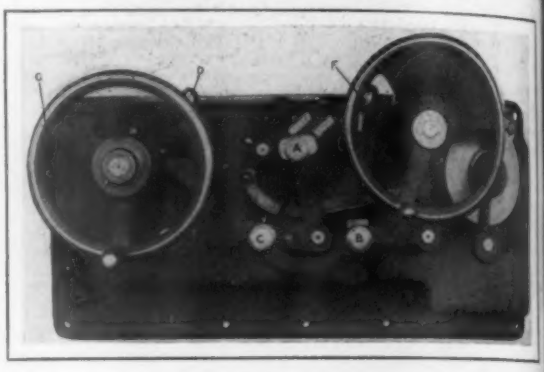


Fig. 3—The Arrangement of the Mechanism for Varying the Table and Grinding Wheel Feeds

the rate being controlled by the adjusting screw E. For gauging purposes, there is a large micrometer dial and an automatic power feed knock-off forms a part of the construction. The lever F, which is operated in and out, controls both the regular and rapid hand feeds. In its inner position, the regular hand feed is engaged, while in the outer one the rapid feed is available. Engaging the rapid feed causes the power feed to be automatically disengaged and rendered inoperative, the reason for this being that the rapid feed is altogether too fast to be used when the machine is in operation.

The machine is provided with a pump to supply water, one stream being carried through the spindle. The centrifugal force of the spindle drives the water between the wheel and the work, thus, it is emphasized, keeping both cool and free from dust. The inside stream of water is controlled through the lever G, which is conveniently located on the front of the gear box unit. An outside stream of water is conveyed to the outside of the wheel and also for cleansing purposes. The wheel guards shown in Figs.

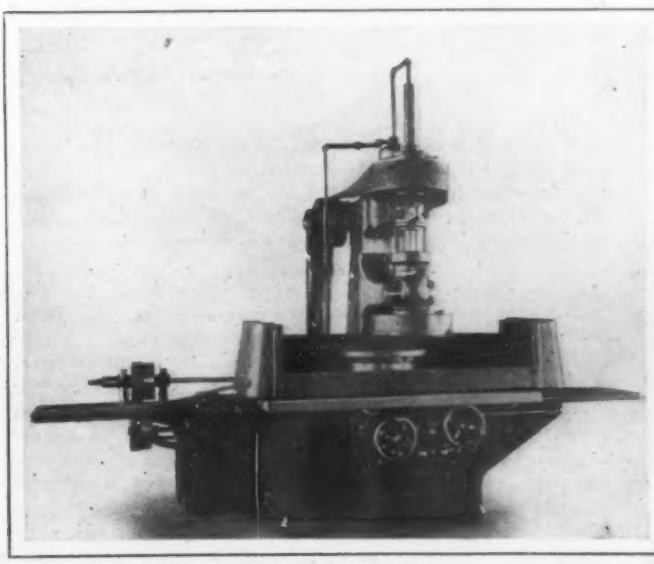


Fig. 1—Front View

Fig. 2—Rear View

TWO VIEWS OF A NEW 22-IN. VERTICAL-SPINDLE SURFACE GRINDING MACHINE EQUIPPED WITH MAGNETIC CHUCKS AND GUARDS

and 2 are also relied upon to assist in controlling the ater. A large tank, which is located on the back of the achine, where it may be readily cleaned, receives the ater directly, no pipes being used.

Several types of chuck can be used with this machine. hese include a rectangular magnetic chuck, single plain magnetic rotary chucks and duplex and quadruplex ucks. The rectangular magnetic chuck is designed for olding a large variety of work and can be readily applied the table. Its construction is waterproof throughout, us enabling water to be used freely without any danger short-circuiting. The rotary chucks are dust and water roof, the driving units being located outside of the wheel hard, an arrangement which, it is pointed out, makes it mpossible for water to get into the chucks. This mechanm is so designed that it automatically engages when the uck is brought under the wheel and disengages when it removed to be reloaded. The single rotary chuck is signed so that it may be tilted, thus enabling either conve or convex surfaces to be ground. The double chuck, hich is shown in Fig. 4, can be tilted the same as the ngle chuck, the adjustment of each part being independnt of that of the other. The quadruplex chuck cannot e tilted and is non-adjustable. It cannot, therefore, be sed for the production of concave or convex surfaces, eing designed more especially for such work as gear anks, washers, disks, etc.

The machine is designed for motor drive only, the ethod of mounting the motor directly upon the floor eing clearly brought out in Fig. 2. Provision has also een made to give the correct belt angle from the idler o the motor pulley at all times, irrespective of the diamter of the latter. This feature is made possible by the onstruction of the left idler pulley which is so mounted hat it may be swiveled to the proper angle, after which

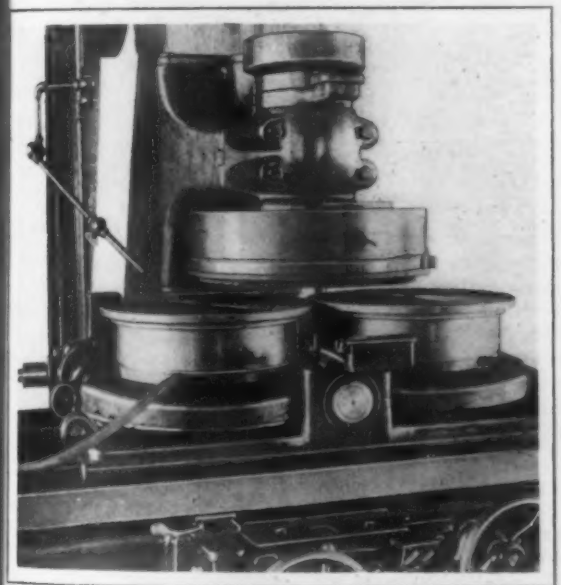


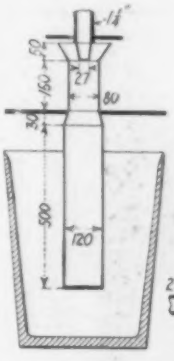
Fig. 4—Detail of the Grinding Wheel and a Double Magnetic Chuck

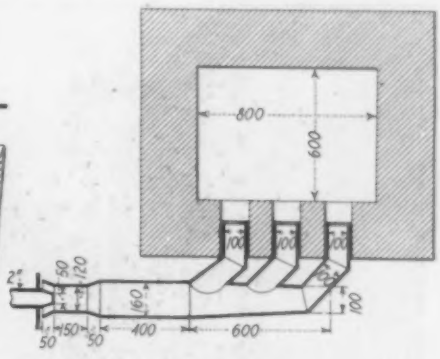
it is permanently doweled in place. The size of the motor used varies from 20 to 35 hp., according to the nature of the work for which the machine is to be used. A constant-speed motor, running at approximately 1200 r.p.m., is employed.

Although the installation of its equipment by the Busch-Sulzer Bros. Diesel Engine Company, at St. Louis, Mo., will not be completed for some weeks, work has been started in the plant. It is expected that the remainder of the machinery, which is for finishing the product, will be in place by the time the work from the initial section of the shop reaches the finishing and testing department in its regular course. The pattern department has begun operating, and in sucession the departments following in proper order will be organized, so that production may be fully under way by the time the last installation work is done.

Drying Ladles with the Bunsen Burner

In Stahl und Eisen, July 31, 1913, Otto Johannsen devotes an article to various methods of drying ladles, dealing particularly with a method of employing the principle





General Dimensions in Millimeters

Fig. 1—Application of Bunsen Burner to Ladle Drying

Fig. 2—Application of Bunsen Burner to a Metallurgical Furnace

of the Bunsen burner. In some present methods of drying ladles the admission of the flame and the mixing of the necessary air for combustion often present difficulties. The gas burns with a flickering cold flame and often only in the upper part, so that the bottom of the ladle which needs the most heat receives the least. It would often be better if the ladle could be inverted over the source of heat, but this is impossible, because the clay covering of the bottom is likely to fall out. The simplest arrangement for the intimate mixture of gas and air is the Bunsen burner. The adaptation which Mr. Johannsen especially recommends for ladle drying is shown in Fig. 1. It is an inverted Bunsen burner which burns in the interior of the ladle. In order to cause the flame to burn as far as possible on the walls of the ladle and not ascend the middle, a shield is provided. This prevents also the drawing of the products of combustion into the burner mixing pipe. The end of the burner is covered with wire netting of 4 mm. mesh, and the long narrow design makes possible a rapid delivery of gas and a high temperature. Producer gas, blast furnace gas, or waste gas from the furnaces can be used. Ladles are said to dry very quickly with the use of this burner.

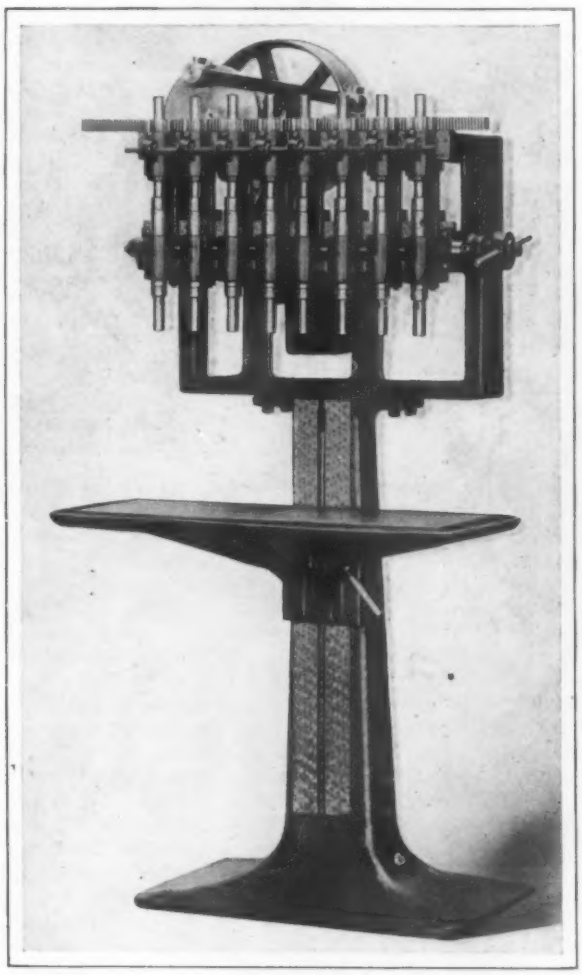
The author also suggests a rather interesting application of the Bunsen burner to a small metallurgical furnace. The method of applying it is shown in Fig. 2. The burner is provided with three openings, each covered with wire gauze and entering the lower part of a small furnace. As soon as the furnace is red hot, it is impossible for the gas to go out and the entire furnace assumes an even glow. Waste furnace gases are especially adapted to this use.

Silicon Steel for Electric Purposes.—In a paper before the German Foundrymen's Association, Berlin, F. Goltze stated that the results of extended experiments showed that silicon steel is to be preferred to manganese steel for electrical purposes on account of its superior magnetic properties. Annealing improves the structure and the mechanical properties, and has considerable effect on the magnetic properties, at 750 deg. C. reducing them slightly and at 1000 deg. C. establishing a marked improvement, while at 900 deg. C. it has a decidedly adverse influence. Coarseness of grain and good magnetic properties were found to go hand in hand. The addition of aluminum to cast iron was also found to increase the magnetic properties of the iron.

An alloy of cobalt and tin of from 40 to 60 per cent. each has been known for a long time to be highly acid proof, even withstanding aqua regia, but too brittle for any practical use. It is now learned that by alloying copper with from 5 to 20 per cent. of this cobalt-tin alloy an alloy is produced that can be filed, bored, turned and forged and that retains a high degree of uncorrodibility. It is best prepared by dissolving the cobalt-tin in the copper.

A Multiple-Spindle Valve Grinding Machine

The Foote-Burt Company, Cleveland, Ohio, is manufacturing an adjustable multiple-spindle oscillating valve grinding machine, which is designed for use in the building of automobile engines. It is stated that with the use of this machine a complete set of valves can be seated in less time than it ordinarily takes to seat one by the hand method. The spindles can be supplied in any number from 2 to 12, and are adjustable with a minimum center distance of 2 in. The table is also adjustable vertically, thus giving a flexible machine and one which, it is stated, can handle any type of cylinder.



A Recently Developed Adjustable Multiple-Spindle Oscillating Valve Grinding Machine

The spindles are arranged with a ball bearing thrust at each end of the bearing and have a travel of 2¼ in. The spindle noses are equipped with No. 1 Morse tapers. The spindles reverse every turn and a quarter, and a cam is provided which raises and lowers the spindles every 20 revolutions to permit the grinding compound to enter the valve seat.

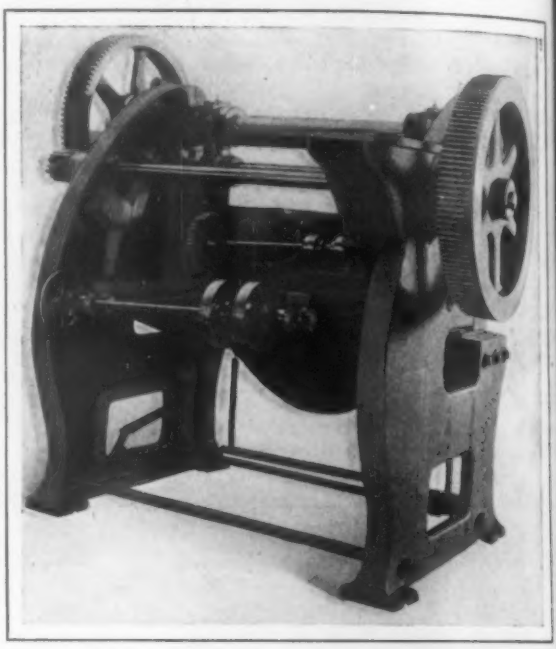
New Electric Steel Foundry at Scranton

The Electro-Steel Products Company, whose general office is in rooms 414 and 415, Miller Building, Scranton, Pa., has secured a tract of 25 acres near Connell Junction, within the city limits, and will erect a plant for the manufacture of high grade steel and steel castings. A 3-ton Frick electric induction furnace will be installed. The electric current will be secured from the Lackawanna & Wyoming Valley Railroad Company at a low rate. Charles H. Pond, of the Scranton Forge Company, is president of the new company; J. D. Jenkins, of Pittston, is vice-president, and J. H. Hungerford, of Scranton, is secretary and treasurer. The general manager is H. O. Bernhardt, who states that he expects to produce a steel casting "that will be lighter and stronger than is being made in any other steel foundry in this country."

Squaring Shear with Motor-Operated Back Gauge

A device for adjusting the back gauge by means of a separate electric motor is the special feature characterizing a new power squaring shear that has been brought out by the Niagara Machine & Tool Works, 639 Northland avenue, Buffalo, N. Y. The attachment is intended for use where it is necessary to adjust the back gauge frequently for strips of different widths, and it is claimed that its use will be found advantageous where much of this work has to be done.

The motor is mounted on the back web of the cutter bar which carries the upper knife. It drives an intermediate shaft with pulleys that are belted to the bevel gear shaft by straight and crossed belts. From the bevel gear shaft motion is transmitted to the back gauge by two feed screws. A reversing clutch controlled by a hand lever is provided on the pulley shaft to enable the back gauge to be moved to different positions on the brackets, according to the width to be cut off by the machine. The back gauge brackets are fastened to the cutter bar, and there is a graduated scale mounted on one of the arms to facilitate the setting of the gauge.



A Power Squaring Shear in Which the Adjustment of the Back Gauge is Regulated by an Electric Motor

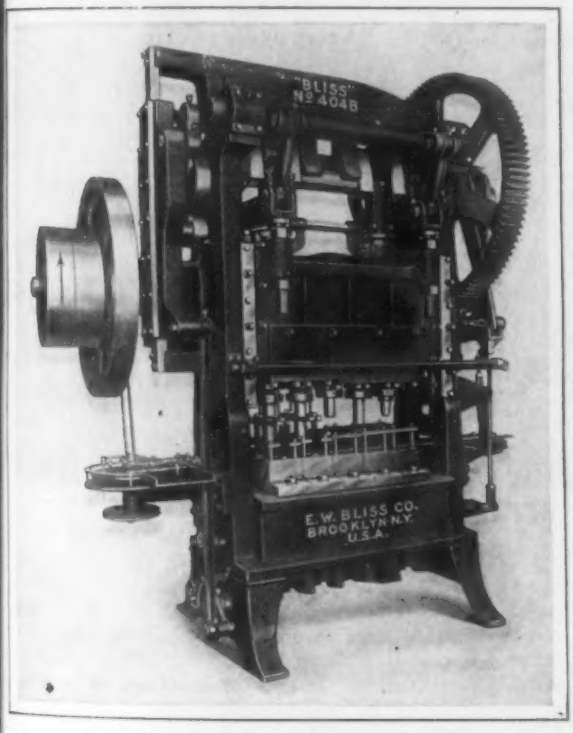
Fuel Oil and Coal in California.—In San Francisco, as in other cities of the Pacific coast, the use of petroleum for generating steam by railroads and manufacturers has largely supplanted that of coal, which is at present confined almost entirely to the consumption for domestic purposes. The total quantity of coal consumed in San Francisco and the neighboring cities on the eastern shore of San Francisco Bay in 1912, according to E. W. Parker, of the United States Geological Survey, was apparently considerably less than 500,000 net tons. It is estimated that the total annual consumption of oil for fuel, including that used in the manufacture of gas, in California is between 50,000,000 and 55,000,000 barrels, equivalent to approximately 1,500,000 tons of coal, or about twice as much as the coal consumed within the State. The total consumption of coal in 1912, estimated from the rail and water receipts, was about 770,000 net tons.

The Standard Steel Castings Company, which a few months ago established a steel foundry on West Seventy-third street, Cleveland, Ohio, will shortly begin the erection of additions which will about double the capacity of the plant. An extension to the main building, 60 x 170 ft., will be built, and another building will be erected to be occupied as a cleaning and shipping room. An additional 2-ton converter and a 5-ton crane will be installed. The company has increased its capitalization from $100,000 to $150,000.

Automatic Five-Operation Drawing Press

For the rapid production of deep drawn seamless shells, such as lamp and lantern bodies and lamp fonts, oil can bodies, drinking cups and a similar class of articles which require a series of drawing operations, the E. W. Bliss Company, 11 Adams street, Brooklyn, N. Y., has recently designed and placed on the market a new type of automatic feed press. This press is equipped with a friction dial feed and a lateral carrying feed. It has five slides, each of which is independently adjustable, and five operations are performed at each revolution of the crankshaft, although with this type of press the number of die operations which may be performed simultaneously is limited only by the number which can be done without annealing, as wider presses may be used and the number of slides increased. The use of these multiple-operation presses will, it is pointed out, effect material reductions in operation costs as compared with the old method of doing the work in single-slide double-action presses, as well as increasing the production. Intermediate handling of the shells between operations is also eliminated and in addition a considerable saving in shop room is effected, as this one press doing five operations replaces five single units.

In operation, the shells that have been previously cut and formed from sheet stock are placed on the revolving disk of the friction dial feed, which carries them up and against an automatic stop gauge. This gauge permits a single shell to pass out for each revolution of the crankshaft, and after passing from the dial feed, the shells are taken hold of by the lateral feed, which automatically carries them from one to another of the successive dies and finally discharges the finished article through a chute at the end of the press. From this description of the operation of the press, it will be seen that there is no danger to the operator, since all that is required is to place the shells on the revolving dial.



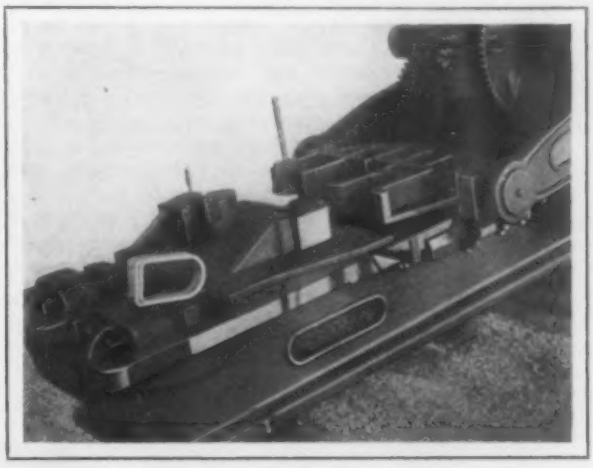
A New Press for the Automatic Production of Deep Drawn Seamless Shells Which Performs Five Operations at Each Revolution of the Crankshaft.

The lateral feed has two motions, the first an opening and closing one for gripping the shells and the other, which is reciprocating, to pass the shells from one die to the next. It is operated by cams and links from both ends of the machine, an arrangement which, it is pointed out, gives a perfectly parallel feed motion. The bottom knockout, which is actuated by a cam, is driven from the crankshaft through links and levers, and the construction is such that the travel for each slide may be varied, according to the depth of the draw. An automatic friction clutch is provided, which places the movement of the press under practically instantaneous control of the operator.

The press illustrated makes 35 strokes per min., or 100,000 operations per 10-hr. day. The weight of the machine is 25,000 lb.

Forming Spring Stirrups on a Bulldozer

An interesting operation has been recently performed on the No. 4 bulldozer built by Williams, White & Co., Moline, Ill. This was the forming of the stirrups for locomotive springs from a die of simple construction especially designed for the work.



View of a Portion of a Power Bulldozer Showing the Arrangement of the Dies Used to Form the Stirrups for Locomotive Springs and a Completed Piece

In bending the stirrups three strokes were required, and the operation was performed by only heating the stock once. Bar spring steel stock, 5/8 x 2 in., was used, the ends being scarfed and bent round before being placed in the die. The first operation consisted of forming the bar into a U shape in the right portion of the die, while in the next operation one leg of the U was bent across. After this has been done, a piece which has the same thickness as the stock is removed from the traveling die. The incompleted stirrup is then turned over and the leg completed, a stirrup in its finished form being shown at the left. The completed stirrup measures about 6¼ x 11 in. The bulldozer makes approximately 10 strokes per minute and the three bends required to form the stirrup are made by three successive strokes.

The Lumen Bearing Company's Expansion

The Lumen Bearing Company, brass founder, is making an addition to its plant at Buffalo, N. Y., which amounts to about 15,000 sq. ft. On the ground floor provision is being made for an increase of the general stores, fuel storage and sand storage, and the cleaning room and shipping room are being relocated in order that the output can be taken care of to better advantage. Sidings are being relocated, so that fuel, iron and metal for the babbitt room can be elevated and the distribution of fuel to various parts of the plant handled to better advantage. The present overhead trolley system and the industrial track are being extended to take in the new construction. On the second floor of part of the addition provision is being made for the babbitt room, carpenter shop and an experimental department. The latter is being moved from the present laboratory room on account of the demand for general experimenting in engineering work.

The increase in capacity amounts to about 20 per cent., as by the new arrangement the number of molders' benches is increased from 50 to 69. In the babbitt department the increase is about 40 per cent.

The construction of the new building is steel concrete, I-beam and flat-slab construction being used throughout the second floor and the roof. The roof of the second floor has been extended south some 80 ft. to provide for necessary quick additions to the plant when business is running at its maximum or at an overload.

The Lumen Bearing Company is extending its business throughout the country at a very gratifying rate. The Toronto plant is also active. Plans are being prepared for a very substantial addition to it which will probably be completed this year.

The Coleraine Iron Ore Washing Plant*

Concentrating the Western Mesaba Silicious Deposits of the Oliver Iron Mining Company at Trout Lake, Minn.

BY JOHN UNO SEBENIUS

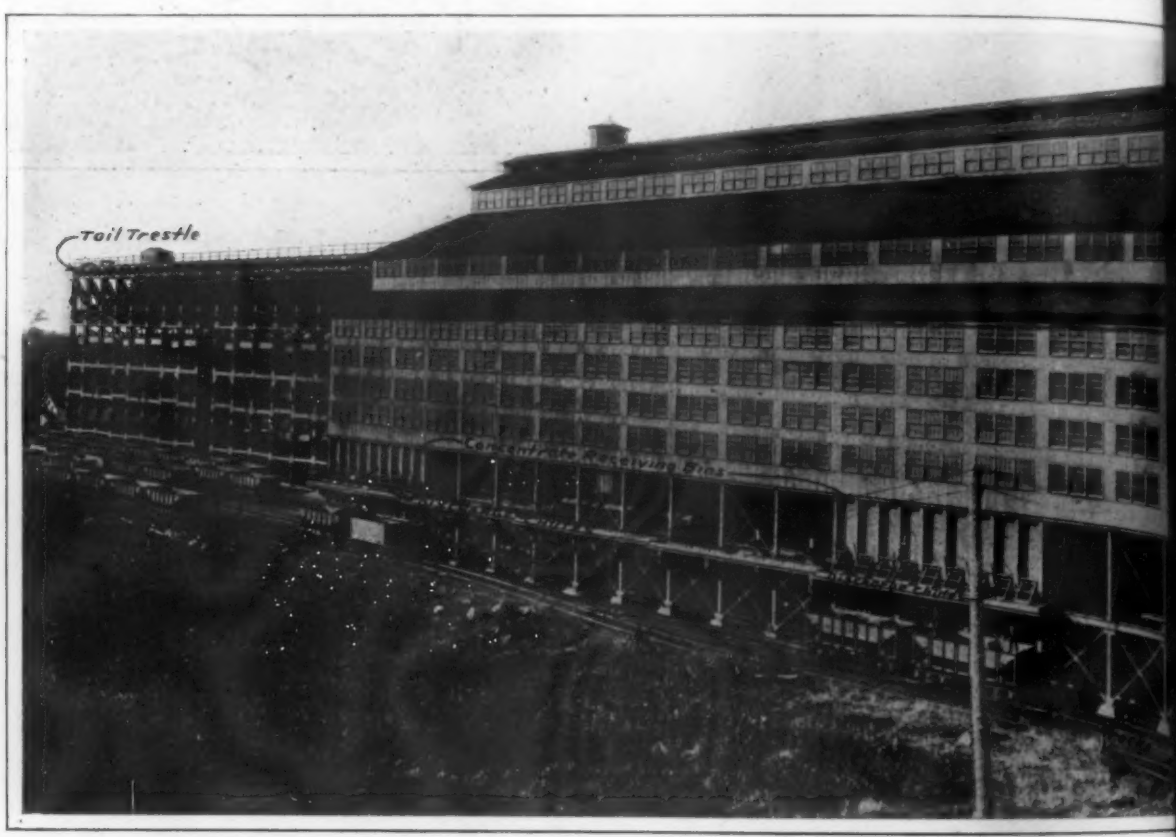
In approaching the problem of utilizing commercially the ore material from the vast deposits developed on the Western Mesaba Range we were confronted with the following conditions and facts:

1. A very heavy overburden as compared with the depth of the available ores or the ores directly and easily amenable to concentration.

2. By the occurrence very generally of a more or less thick layer of cretaceous material, which is unmerchantable and further unfit for present methods of concentra-

this material and the expense connected therewith, be were forced to construct our plant so that a considerable portion of this could be advantageously dealt with in the mill operation. This particular feature in the mill means a large latitude of strength, durability and efficiency of the machines selected.

5. Whereas most of the ore in the washable material is rather coarse, there is nevertheless quite a large percentage of very fine, rich ore contained therein, which on account of its exceeding fineness is not desirable from a furnace



General View of the Trout Lake Ore Washing and Co

tion, but which on the other hand could not be wasted, as it carried considerable iron content and had to be removed and stockpiled at a considerable expense.

3. The fact that whereas there did occur in these deposits large tonnages of ore amenable to concentration, there was also found with it a large quantity of material entirely unfit for concentration, rough and hard in character and so large in size that it had to be sorted out either by hand or machinery, as the occasion would demand, at a considerable expense over and above the ordinary method of handling such material and disposing of it.

4. The further fact that the material in and between the layers of standard wash ore comprised a vast quantity of material which was neither washable matter nor hard rock and which could readily be sorted out and in fact consisted of every gradation possible between these extremes. On account of its character and occurrence we were not only confronted with the necessity of handling

standpoint, nevertheless has to be saved, as it already has borne a share of mining and transportation expenses, and for economical reasons alone could not be wasted when once delivered into the plant.

6. The occurrence of paint rock. This material being a derivation of an original slate layer is, in its nature, sticky when wet and difficult to handle and contains a considerable amount of moisture. It is not amenable to concentration, but on the other hand its chemical composition is such that portions of it can and must be shipped direct, while the remaining portion, which has to be removed to get at the underlying wash ores, cannot be wasted and must be, at some additional expense, stockpiled in case this material at some future day may become merchantable.

7. Practical, economical and lease conditions demanded a large tonnage much greater than generally was handled by mills up to that time elsewhere in the country.

8. Large areas required with extensive track system to provide for the deposition of great quantities of overburden to be removed and for the stockpiling of low-grade material not amenable for concentration.

Concentration of the Western Mesaba Silicious Ores

In 1901 and 1902 Walter Barrows, Jr., Chas. A. Purdon and associates after obtaining certain exploration data

*From a paper presented to the Minnesota meeting of the Lake Superior Mining Institute. In the introduction to the paper, the author, who is chief engineer of the Mining Department of the Oliver Iron Mining Company, referred to some of the geological facts in connection with the formation of ore on the western Mesaba Range, but for lack of space this portion of the paper had to be omitted. Mention may be made, however, of an illustrated account of the early experiments in concentrating the lean ores at Coleraine, including a statement of the geology of the region, printed in *The Iron Age*, of January 6, 1910.

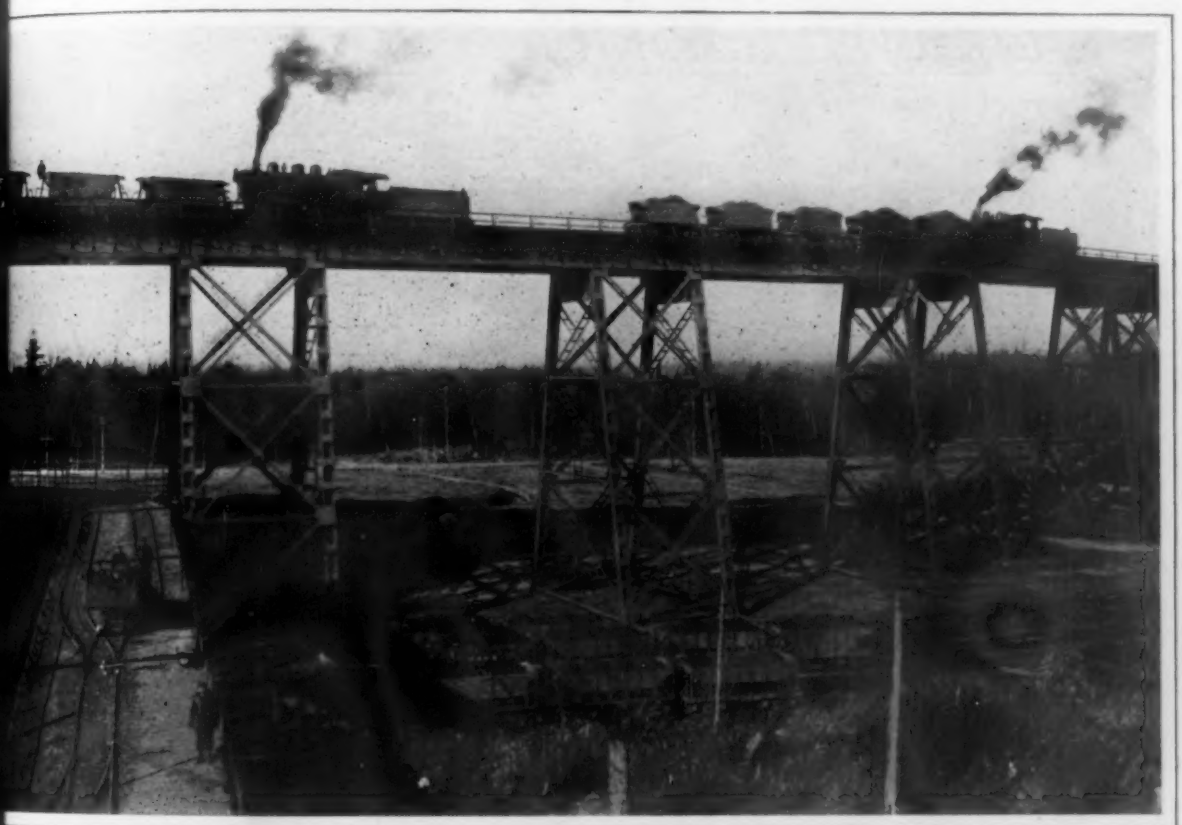
om the Arcturus property as well as having secured adtional information by drilling on that property, desirous ascertaining whether this ore was amenable to some rt of concentration, sent a carload of ore to Cedartown, a., for treatment. The result seemed so satisfactory that ey installed on the property, at their expense, a small ncentrating plant consisting of conical screens and a set McLanahan jigs. In 1903 and 1904 a small plant of mewhat similar construction, but without the jigs was stalled and operated at what is now known as the Holan mine by Mr. Congdon and associates. While these o smaller plants clearly indicated that something could done at least with some portions of the vast ore bodies ntained in the district, it also became evident that an pliance of that kind would not meet the requirements, rst on account of the variety of material to be treated, d second on account of the large quantities that had to handled. For this reason the officers of the Oliver on Mining Company appointed a committee to make a orough study of the concentration problem here preented, ascertain what was done elsewhere and, if possible, find machinery which would meet the requirements.

After due consideration of all the facts and after an extensive trip over the western and southwestern portion of the United States, the commission prepared its report recommending a scheme which seemed to them to offer a solution of the problem in hand. As suggested by the committee an experimental plant was decided on and erected in 1906 in the vicinity of the Canisteo deposits. In 1907 and 1908 experimental work was being conducted in this plant with the machinery originally installed as well as with additional different concentrating machines which, from time to time, were tried out upon the suggestion and request of manufacturers.

After a long, expensive and exhaustive investigation and after compilation and study of results obtained in this plant, it was conclusively proved: 1, that these ores could be economically and successfully treated and in a large scale made to render a merchantable product of a good desirable physical structure; 2, that machinery substantially such as suggested by the committee with some changes and improvements would successfully treat these ores.

The Trout Lake Concentrating Plant

With these and other facts and data at hand the construction and erection of the present concentrating plant was undertaken. This work was commenced in April, 1909, and was complete with the machinery installed ready for use in 1910. Attached to the main building is a table house large enough to accommodate concentrating tables for five units and space for a small machine shop and supply store. For the handling of the railroad cars in the upper portion of the mill there is provided on the north side of the main structure a viaduct approach 650 ft. long and on the south or opposite side a tail track 300 ft. long. The latter is so constructed as to permit it being incorporated directly in a possible future extension of the plant. The building, viaduct approach and tail trestle, as well as the table house, are constructed of steel, the total amount used being 6100 tons. The building in its entirety is covered by corrugated steel sheeting over 2 x 6-in. wood sheeting fastened directly to the structural steel. The north end of the viaduct approach is connected with the main roadbed forming the track system for delivery of the crude ore to the plant over an embankment of a maximum height of 110 ft. containing over 2,000,000 cu. yd. of dirt. On the east side of the building is arranged a system of discharge tracks leading directly into the yard. The elevation of the receiving tracks—going over the embankment and approach viaduct into the mill—and the discharge tracks at the foot of the mill is 90 ft.



Oliver Iron Mining Company, Coleraine, Minn.

While not intended for winter operation, the building is provided with a high pressure heating plant, the steam for which is supplied by a small boiler plant located in the immediate vicinity of the mill. All inside wiring is placed in conduits. A traveling crane electrically operated over a track extending the entire length of the building provides means for handling the heavy machinery and for other duties.

Power Plant and Transmission

The power plant of the mill is located on the immediate shore of Trout Lake, 7000 ft. distance from the main building. It was placed at that distance to obtain clear water, this being impossible nearer the mill on account of the tailing discharge into the lake at that point. Steam is generated in a battery of six 72-in. x 18-ft. horizontal return-tubular boilers housed in a building 53 x 120 ft., of steel frame, brick, nogged and covered with corrugated steel. Draft for these boilers is obtained through a chimney of hollow radial tile 150 ft. high.

The engine and generator house is of the same general

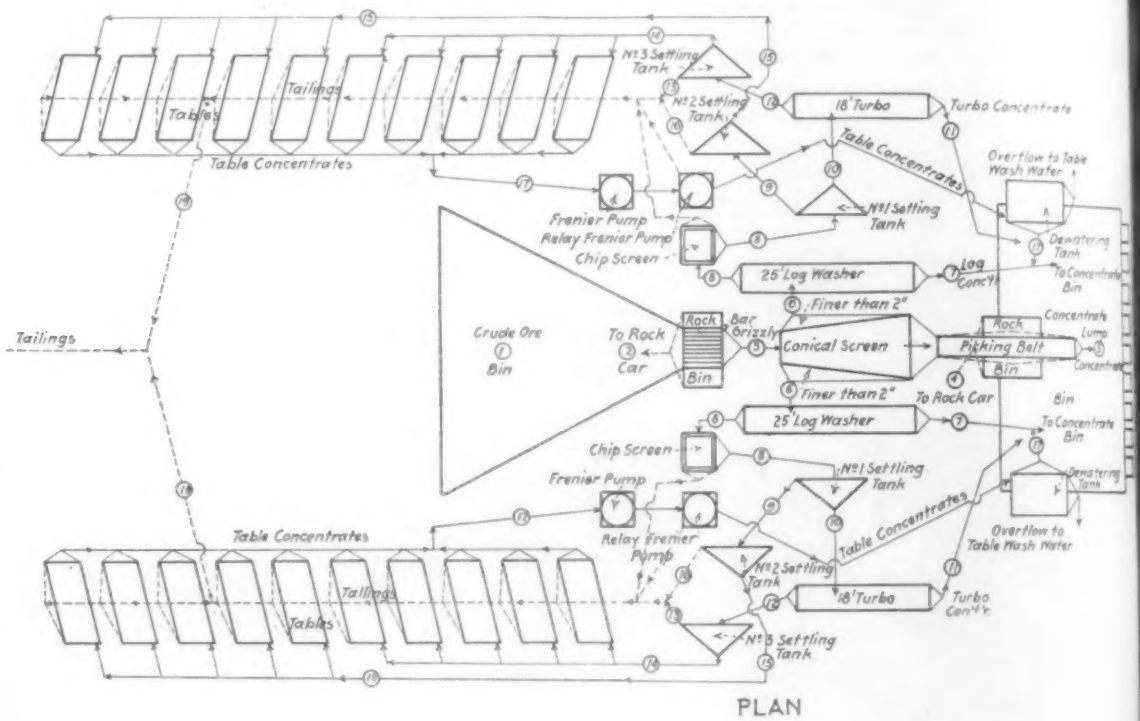
construction as the boiler house and 82 x 132 ft. In it is housed one 26 x 52 x 48-in. horizontal cross-compound Reynolds Corliss engine, direct connected to a 3-phase, 60-cycle alternating-current generator producing a current of 6000 volts, 1250 kw. (equaling 1675 hp.). There are also two 26 x 52 x 48-in. Prescott compound pumping engines, of the flywheel type, each with a daily 24-hr. capacity of 1,000,000 gal. against a total lift of 240 ft. Each of these pumps is capable of furnishing water necessary to operate the mill. As the five concentrating units contained in the mill described require individual consumption of 1300 gal. per minute per unit, the power requirement of each pump is 400 hp.

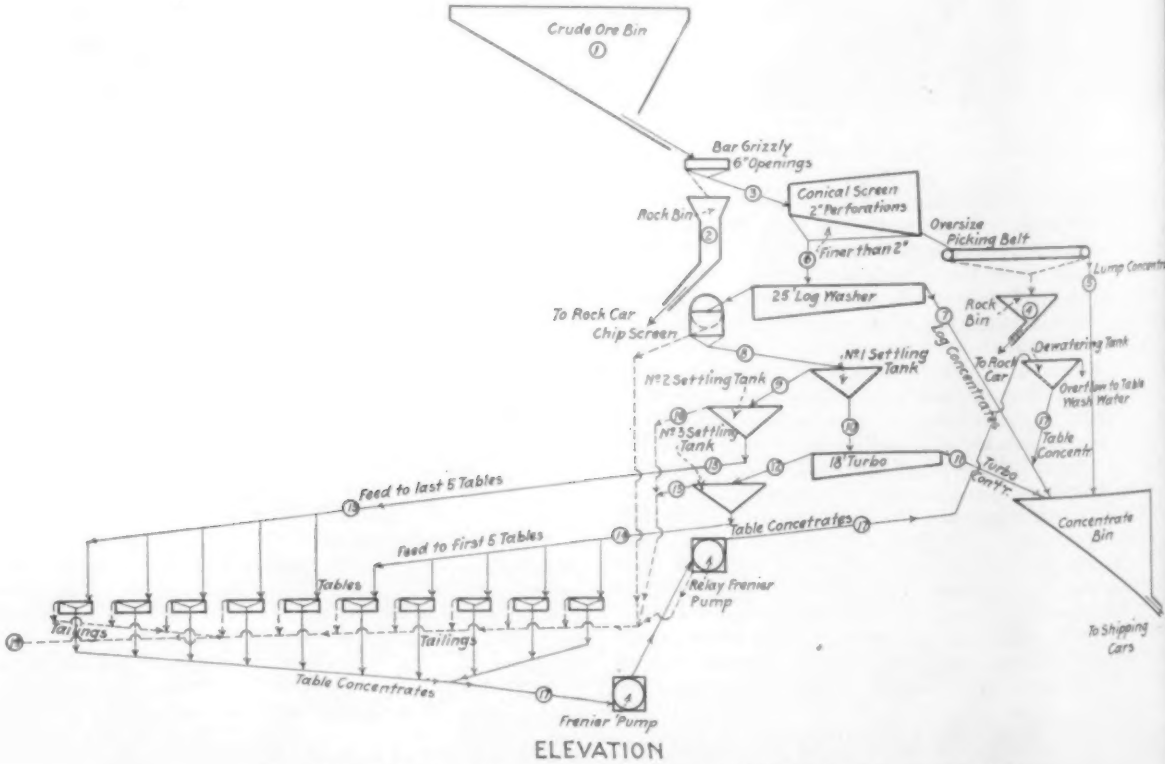
The electric current is transmitted over surface lines to a transformer station near the mill where its pressure is stepped down to 440 volts, the working pressure used in the plant. Power transmission in the mill is so arranged that each working unit and the main group of machi in the units themselves are independently operated motors. All buildings are electrically lighted. A tra ing crane is provided for handling the heavy machiner

The water supply is obtained from the lake thro a 40-in. steel intake pipe 400 ft. long and is conduc through a 30-in. lap-welded steel pipe to a 100,000-g cylindrical steel tank at the mill. The water pressure the various floors of the mill varies from 20 to 75 lb. p square inch.

Concentrating Machinery and Appliances

As the mill stands to-day the plant contains five ind pendent units and appliances. Each individual unit made up of two half units which are dependent on ea other only in bin and screening capacity. This arrang ment was adopted to prevent delay in the entire mill a



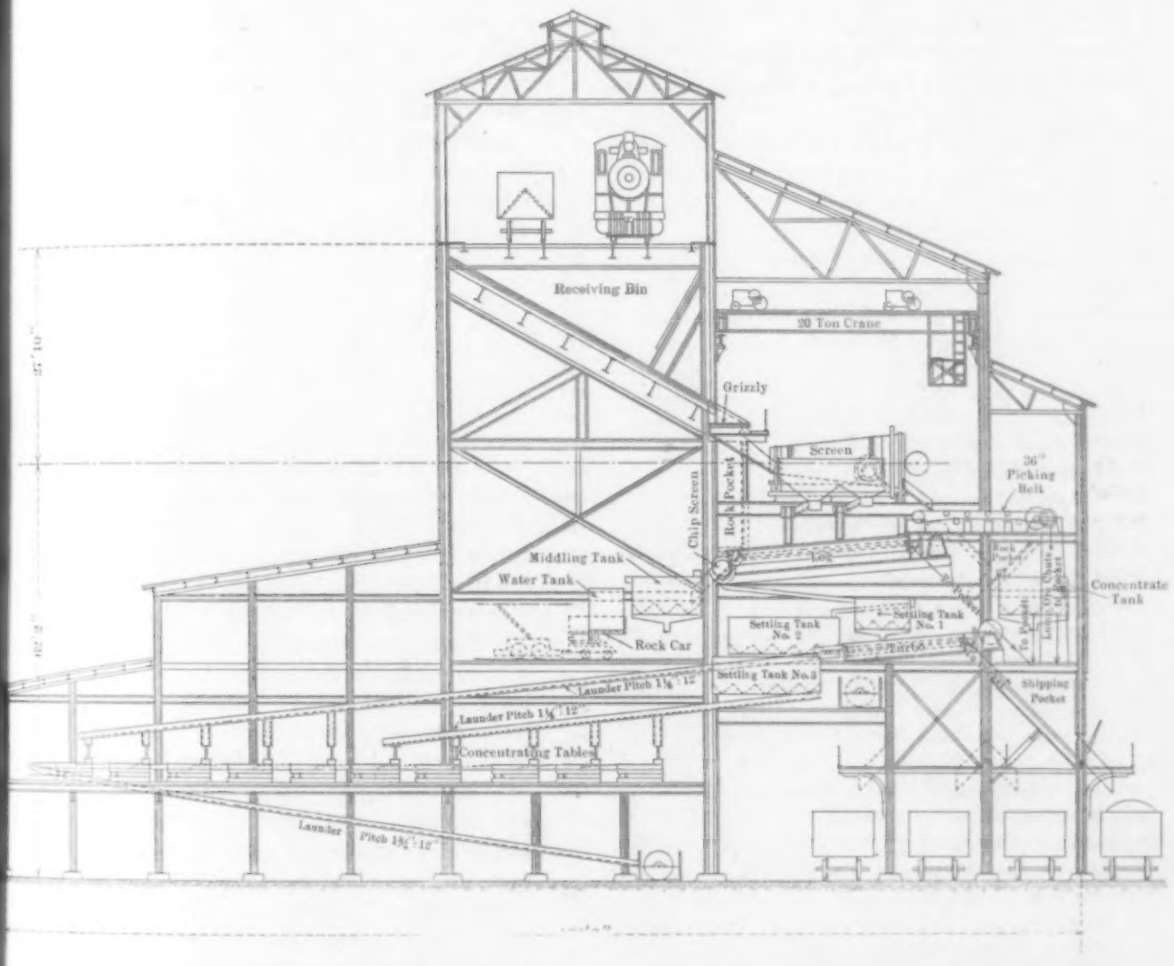


Flow Sheet of the Trout Lake Concentrating Plant of the Oliver Iron Mining Company

ach separate unit should breakdowns occur. Instal- t of individual units was also necessitated by lease ditions requiring that ore from each property be lled separately. All units are entirely similar in con- ction, but were installed at various times, the first and nd units being erected in the spring of 1910, the third he fall of the same year and the fourth and fifth com- ed at the beginning of the season 1911. Precaution taken to eliminate from the mill construction all light hinery such as link belts, chain elevators, conveyors automatic feeding appliances.

Each individual unit is made up as follows: On top the mill and directly under the crude ore tracks each contains a receiving bin with a capacity of about 500 s of crude ore. At the discharge end of this receiving is a grizzly on 12-in. centers, and also a hydraulic zle connected to the water system. This hydraulic hutches covered with perforated steel plates through which a strong current of water under a pressure of 50 lb. per square inch is injected.

The waste material coming over the overflow end of the log washers contains chips, waste and other material, and for this reason a chip screen has been placed directly behind each log washer. Directly under and on each side of these log washers are placed three steel settling tanks, Nos. 1, 2 and 3, at different elevations. Located directly under No. 1 tank on each unit is placed one smaller log washer locally known as turbo. The size of these turbos is as follows: Length, 18 ft.; width, 4 ft.; depth, 1½ ft. They are of the same general construction as the larger log-washers provided with a rising water column under pressure forced through hutches and hutch-plates in the same manner. The tanks above referred to are V-shaped. Tank No. 1 is 5 ft. in width, 8 ft. in length and 4½ ft.



Cross-Sectional Elevation of the Coleraine Iron Ore Washing and Concentrating Plant

zle is capable of discharging into the receiving bin at direction of an operator a heavy stream of water der a pressure of 33 lb. per square inch. The bin ex- sion under the grizzly is through an apron directly con- ted with one conical revolving screen or tommel of 2-in. rforations. Passing through the center and along the tire length of this trommel is a spray pipe. The size the trommel is: Length, 20 ft.; diameter at the small d, 4 ft.; at the larger end, 8 ft.

Directly below the large end of the trommel is placed conveyor 36 in. wide and 20 ft. long to take the over- e material from this screen. Directly below the trom- el is constructed a bin or junction box divided into two mpartments into which the undersize material falls. On ch side of this bin and below it and at proper distances d elevations are placed two log washers, each taking e-half of the undersize material delivered into the bin m the trommel. The size of these log washers are: ngth, 25 ft.; width, 6 ft. 8 in.; depth, 3 ft. They are aced at an incline of 1 in. to the foot, and are each pro- ded with twin screws with chilled cast-iron paddles. eir bottom is constructed so as to provide for three deep. Tanks No. 2 and No. 3 are 6 ft. in width, 16 ft. in length and 5½ ft. deep. All are provided with spigots for the discharge of the accumulated material.

In the table house at some distance below these three steel tanks are located four batteries of five Overstrom tables, arranged in two parallel series. Each of the 20 concentrating tables is 14 ft. in length and 6 ft. wide along end lines provided with riffles, which are in some tables constructed of wood and in others of rubber. To convey the table concentrate from the table house two 54-in. Frenier spiral sand pumps are installed in each one-half unit. These pumps discharge into a dewatering tank located immediately above the bin into which is assembled all the concentrate from all machines constituting the unit. This dewatering tank is also of steel V-shaped 7 x 12 ft. at the top and 5½ ft. deep.

The conveyor belt referred to is known as the picking belt. On each side of it is located a steel chute leading to what is known as a rock pocket made of steel. This discharges into cars below. Over a track system overhead-

(Continued on page 479)

ESTABLISHED 1855

THE IRON AGE

Published Every Thursday by the

David Williams Company

239 West 39th Street New York

W. H. Taylor - *President and Treasurer*
Charles G. Phillips - - - - *Vice-President*
Fritz J. Frank - - - - - - *Secretary*
M. C. Robbins - - *General Manager*

Editors

Geo. W. Cope A. I. Findley W. W. Macon

Charles S. Baur - - *Advertising Manager*

Branch Offices

Chicago: Otis Building Philadelphia: Real Estate Trust Bldg.
Pittsburgh: Park Building Cleveland: New England Building
Boston: Equitable Building Cincinnati: Mercantile Library Bldg.

Entered at the New York Post Office as Second-class Mail Matter

Subscription price: United States and Mexico, $5.00 per year; to Canada, $7 50 per year; to other foreign countries, $10.00 per year.

CONTENTS.

Structural Steel Fabrication at Rankin, Pa..... 435
Mesta Blowing Engines Shipped to Australia..... 440
Canadian Iron Ore in 1912..... 440
The Norton Surface Grinding Machine..... 441
A Remarkable Immigration Movement..... 441
Plants of the German Machine Works..... 442
A Machine for Seaming Sheet Metal Work..... 443
A Manufacturing Roll-Grinding Machine..... 444
Status of Canadian Iron and Steel Works..... 445
A New Refractory 445
Drilled Holes in Structural Steel..... 446
New Heat-Treatment Plant at Altoona..... 446
A Special Lathe for Turning Tapers..... 447
Natural Gas in New Brunswick..... 447
A New Surface Grinding Machine..... 448
Drying Ladles with the Bunsen Burner..... 449
Silicon Steel for Electric Purposes..... 449
A Multiple-Spindle Valve Grinding Machine..... 450
New Electric Steel Foundry at Scranton..... 450
Squaring Shear with Motor-Operated Back Gauge..... 450
Fuel Oil and Coal in California..... 450
Automatic Five-Operation Drawing Press..... 451
Forming Spring Stirrups on a Bulldozer..... 451
The Lumen Bearing Company's Expansion..... 451
The Coleraine Iron Ore Washing Plant..... 452
Basic Pig Iron in the Lead..... 456
The Distribution of Rolled Products..... 456
State Control of Shop Lighting..... 458
Correspondence 458
Rioting in Erie, Pa., Molders' Strike..... 459
Minnesota Steel Company Employees' Houses..... 459
The Iron and Metal Markets 460
New Tools and Appliances 471
Electrolytic Method of Preventing Corrosion..... 471
June Iron and Steel Exports and Imports..... 472
The American Locomotive Company's Year..... 472
Pig-Iron Output After Two Panics..... 473
British Iron and Steel Exports Still Increase..... 473
Workmen's Compensation in Wisconsin..... 473
Legal Aspects of Trademarks and Trade Names..... 474
Sanitation at Lake Superior Iron Mines..... 475
Pittsburgh and Vicinity Business Notes..... 477
Receiver for Canadian Iron Corporation, Ltd..... 477
Chas. Mundt & Sons Resume Quickly After Fire..... 477
Welsh Works and the Tin Plate Trade in Canada..... 477
Personal 478
Lake Superior Mining Men at Duluth..... 478
Cincinnati Molders' Strike Settled..... 478
Obituary 478
To Extend Beloit Plant of Charles H. Belsy & Co..... 478
Canada's Pig Iron Imports..... 478
The Machinery Markets 480
Trade Publications 488

Basic Pig Iron in the Lead

In 1908 for the first time more open-hearth s was produced in the United States than Besse steel. As is well known, the preponderance in fa of the basic open-hearth process has been accentu in each succeeding year. In 1911, for the first ti more steel was produced in this country than pig ir The returns for 1912 made a like showing, but wide the gap, the total of steel ingots and castings be 31,251,303 gross tons, while that of pig iron w 29,726,937 tons. The excess of steel was thus 1,524,3 tons, as against a difference of 26,157 tons in fa of steel in the preceding year and a difference 1,208,648 tons in favor of pig iron in 1910.

A feature of the pig-iron statistics for the fi half of this year, which marks an interesting d parture in connection with the two recalled above, that for the first time since these statistics began be gathered more basic pig iron was reported th Bessemer pig iron. As the figures below indicate, t difference in favor of Bessemer iron was small 1912, but the swing over to basic iron became a fa this year:

Production of Basic and Bessemer Pig Iron in the United State
Gross Tons

	1st half 1912	2d half 1912	1st ha 191
Bessemer pig iron	5,572,355	6,091,660	6,285
Basic pig iron	5,405,376	6,012,510	6,497

It is significant of the change that is going o that manufacturers and buyers of Bessemer sheet ba are now considering sliding-scale contracts based, n on the price of Bessemer pig iron, but on that of ba pig iron, with an addition of $1 a ton to represent wh is considered a fair differential between basic a Bessemer raw materials and blast-furnace practic The market for Bessemer iron has been an increa ingly restricted one for several years, while that f basic iron has broadened until such iron has come be the proper basis for reckoning values in steel.

The bearing on the scrap trade of the new pr ponderance of steel production over that of pig iro and of basic pig-iron production over that of Bessem iron, involves considerations that will not be gone in at this time. Two suggestions may be made, howeve First, the enormous open-hearth scrap pile the count is accumulating by making more steel than pig iron steadily retiring to the background the familiar spect of an "ore famine." Second, the reduction in th demand for Bessemer ores and the rapid increase i the consumption of non-Bessemer ores should tend t a reduction in the premium for the former, though th relatively small supply of Bessemer ores will probabl never bring a return of the approximate parity onc existing.

The Distribution of Rolled Products

Inasmuch as new construction of steel finishi capacity has proceeded with intelligent recognition o the probable needs of consumers, the various finishi departments of the industry were kept quite uniform employed last year. With the exception of the ra mills, there was no important group of finishing uni which was conspicuous for lack of employment; n on the other hand was there any branch of the finishi trade which showed a serious lack of capacity to me

requirements. In current trade developments, accordingly, there was no indication that the various finishing facilities of the industry were poorly arranged. It should not be assumed, from these facts, that the growth of demand has been uniform throughout the various finished products. On the contrary, as just intimated, the builders of new equipment in the past few years have as a rule foreseen the consumptive requirements, and have made provision accordingly.

The fact is that there has been considerable change in the relative call for different products, and the study of these ebbs and flows is not without interest. They can be followed by observing the percentage of total output which the various products constituted at one time and another.

Since the recession of 1903-4 the iron and steel industry has had three bursts of demand. The first was the prolonged period of heavy demand in 1905-6-7, the next the evanescent rise of 1909-10 and the last the one which began somewhat less than two years ago. By common consent the 1905-6-7 period is regarded as one of great things, large projects involving important financing, such as railroad improvements and the erection of large engineering and industrial structures in other connections. The present period, on the other hand, is relatively one of small things. Instead of the consumption being particularly by large interests, it is more by the rank and file, more directly by the individual. With the growth in total tonnage all are familiar, though there is reason to think the increase is popularly overestimated. With the relative growth of different finished steel products one cannot become familiar without studying the tonnage statistics, and for this purpose we have compiled a precise comparison, with percentages. The central and most representative year of the 1905-6-7 period was 1906, which is therefore selected for comparison with 1912.

Production of Rolled Iron and Steel and Relative Percentages

	Gross tons		Percentages	
	1906	1912	1906	1912
Exported billets, etc	192,616	347,783	1.0	1.4
Forging blooms, etc	206,110	462,476	1.0	2.2
Wire rods	1,871,614	2,653,553	9.5	10.6
Skelp, flue, etc	1,528,585	2,446,816	7.7	9.9
Rails	3,977,887	3,327,915	20.1	13.5
Structural shapes	2,118,772	2,846,487	10.7	11.5
Sheet piling	*	22,276	..	.1
Plates	2,531,552	3,035,200	12.8	12.3
Sheets	1,074,525	1,857,683	5.4	7.5
Black plates	576,079	982,197	2.9	4.0
Merchant bars	3,992,200	3,697,114	20.1	15.0
Hoops	172,332	270,007	.9	1.0
Bands and cotton ties	408,018	587,395	2.1	2.4
Reinforcing bars	†	274,332	..	1.1
Railroad ties	*	41,396	..	.2
Splice bars, tie plates, etc	224,911††	571,772	1.2	2.3
Nail and spike plate	54,211	45,331	.3	.2
Miscellaneous	851,672	1,187,108	4.3	4.8
Total	19,781,084	24,656,841	100.0	100.0

*Included in shapes.
†Included in merchant bars.
††Tie plates included in plates.

The increase in total rolled iron and steel from 1906 to 1912 was almost exactly 25 per cent. In 1906 11.1 per cent. of the total rolled material was iron, while in 1912 only 6.6 per cent. was iron, showing a great decrease in the proportion of iron, and even an absolute decrease in the number of tons of iron. This is one point of considerable interest, since from time to time in the past year the starting up of little iron rolling mills has been a matter of comment. Another point to which attention may be directed is that the increase in total tonnage in six years has been much smaller than that to which the trade has been accustomed. The increase in the six years is equal to six successive annual increases of only 3.7 per cent., which rate would require a period of almost 20 years for the total tonnage to double. The existing capacity was very fully employed in 1906, and if the capacity of last year was fairly well employed, as it was, this was due to an abnormally small increase in capacity in the six years. The end of 1907 found the steel industry with little demand but with relatively much new construction under way, and the shock of that antithesis made such an impression that in more recent years comparatively little new construction has been undertaken.

In comparing the different items of rolled material in 1906 and 1912 the conspicuous failure of demand to grow is found in rails. In this product there was an absolute decrease, from 3,977,887 tons to 3,327,915 tons. Thus rails constituted 20.1 per cent. of the total output in 1906, but only 13.5 per cent. in 1912—only two-thirds as great a proportion. This put the mills in a trying position, accentuated by the fact that the insistent demand for open-hearth rails made practically necessary the construction of considerable open-hearth rail capacity after 1906.

The relative collapse of rail demand is easily understood. In the period culminating in 1906 there was very extensive rail replacement because the original rails had proved too light for the increasingly heavy rolling stock and the greater speeds. While the building of new railroad has decreased, the building of new track, including second track, siding, yard track, etc., has not decreased materially, if at all; but in the main the rails in service today are being subjected to ordinary wear, whereas at the earlier period they were being unmercifully mashed down.

Of almost equal interest is the decrease in the relative demand for merchant bars. In 1906 this item constituted 20.1 per cent. of the total output, but in 1912 only 15.0 per cent. There was even a slight decrease in the number of tons produced. This relative decrease may be explained in a measure by noting that the merchant bar is one of the primitive sections and men early became familiar with its use and adopted it widely. For certain other forms of rolled material many new uses have lately been found, but the merchant bar was early employed quite generally. In some degree, however, the variation in the merchant bar percentage may be due to the closer classification now employed and to better differentiation by manufacturers in reporting their production.

The most conspicuous gains in tonnage are to be found in sheets and black plates for tinning. The production of sheets, which category includes material 13 gauge and thinner, but excludes black plates for tinning, increased from 1906 to 1912 by no less than 72 per cent.; that is, in 1906 sheets comprised 5.4 per cent. of the total output, but in 1912 the proportion was 7.5 per cent. In black plates for tinning the increase in output was 74 per cent., comprising 2.9 per cent. of the total in 1906 and 4 per cent. of the total in 1912. Thus last year the combined production of sheets and black plates was 11.5 per cent. of the total of all rolled iron and steel, passing the wire rod production, equaling that of structural shapes and almost reaching the rail total. Wire rods, skelp and structural shapes have all shown increases slightly greater than the average of all material. The case of structural shapes is particularly interesting, for 1906 was a year of great things in large structures, while 1912 was hardly so regarded. Yet the output of shapes increased in the six years 35 per cent. while that of all rolled material increased only 25 per cent.

Some other interesting points are brought out by the tabular presentation given herewith. For instance, in six years the production of forging blooms and billets has more than doubled, now comprising 2.2 per cent. of the total output. It is probably unnecessary to mention in explanation of the table that the individual items comprise material not intended for subsequent hot rolling—in the United States. Thus forging blooms and billets are included, also exported billets and sheet bars, but not ordinary billets and sheet bars, because the latter will appear in more finished form, as merchant bars, sheets, etc. Skelp and rods, on the other hand, are included, because they are not subject to further rolling.

The entire comparison indicates quite clearly that the trend is toward greater direct consumption of steel by the masses, as witness the disproportionate increase in sheets, tin plates, skelp, etc., which represent products of widespread distribution.

State Control of Shop Lighting

The Massachusetts State police, who have jurisdiction over the health and safety of men and women in their employment, have been given the power, by a law which has just gone into effect, to regulate the lighting of industrial plants, and owners must obey the mandates under penalty of fine. The paternalism of States in relation to the welfare of employees sometimes takes a form which may justly be criticised. Employers are put to more or less serious expense, with no resulting benefit to any one. The matter of lighting, however, is different. Insufficient illumination is not only bad for the eyes and a hindrance to efficient production, but is responsible for accidents to an extent probably realized by few.

Much information is available on the proper lighting of industrial works. The makers of the lamps and the generating apparatus have reduced the matter to a science. The State inspectors need not seek far for the standard that should be attained. There is little excuse for failure to provide ample light. A large percentage of accidents results from carelessness of employees. Absent-mindedness, disregard of warnings, foolish indifference, are factors always present. But they can and should have a clear view of all places where danger may lurk. Abroad the figures have been worked out showing that the total of cases where the lack of light was responsible for injuries is formidable. In general it is to be said that American manufacturers have been slow to act in meeting the new hazard which has come with workmen's compensation. Carelessness of the worker no longer rids owners of responsibility. Nevertheless, apart from some conspicuous establishments, relatively few have made the advance in matters of safety that was to be expected.

The new concrete ore dock of the Northern Pacific Railway at Allouez Bay, Wis., was placed in commission August 20. The dock was built to handle ore from the Cuyuna range. The first shipment was a consignment of 6500 tons from the Cuyuna Mille Lach Iron Company for the Bethlehem Steel Company.

There are in the United States, according to the Engineering and Mining Journal, 613 metallurgical works classified as follows: Copper refineries, 9; smelteries, 45; lead smelting works, 28; zinc, 28; iron, 314; open-hearth steel plants, 159; and Bessemer steel plants, 30.

Correspondence

Early Work in the Microscopic Study of Steel

To the Editor: Mr. Kreuzpointner is quite right in commenting, in *The Iron Age* of August 14, on Professor Sauveur's article in the issue of June 5, in implying that Mr. Garrison's observations with the microscope were made at a time when my work was confined to interpreting the observations of others, which is still indeed my chief work in this direction. But he is in error in saying that I did not mention Garrison in my "Metallurgy of Steel." Besides citing his work on the Osmund and Husgafvel furnaces (pp. 271-273), I specifically referred to his microscopic examination of some 50 specimens which I submitted to him (p. 178). That which made the use of the microscope possible was chiefly the work of Sorby and Osmond in creating the art and science of microscopic metallography. And it was Professor Sauveur, in my opinion, who far more than any one else actively introduced the practice of that art into this country, though the work of Professor Martens and that of Messrs. Kreuzpointner and Garrison no doubt were of value in predisposing the community to listen to him. He had the great advantage of coming at a riper time.

HENRY M. HOWE.

BEDFORD HILLS, N. Y., August 25, 1913.

The German Museum of Natural Science and Technology

To The Editor: The letter in *The Iron Age* of August 14, relating to the recent tour of Germany by members of the American Society of Mechanical Engineers suggests to a fellow participant the fitness of mentioning one of the monuments to education in which the German engineer is taking a large part. This is the German Museum of Natural Science and Technology now quartered in two large buildings in Munich, but soon to be accommodated in a gigantic structure now in the process of construction on an island in the Isar at Munich, presented to the Museum for the purpose. The present exhibits comprise a countless array of models, many of which may be manipulated at pleasure by the visitor, and many actual size structures, in sections or otherwise cut away, so that the details of construction or manner of operation may be studied. The scope of the museum is truly astonishing, and the one regret is that it is so far away that Young America cannot profit by the opportunities it presents.

The museum stands as a clear demonstration of the high regard noticeable generally in Germany for fostering education particularly along practical lines. In fact, so complete and clear are the models, even from a historical standpoint, that in any given department of natural science or engineering it is believable that the visitor may by a little concentration get a rapidly acquired technical acquaintance with it. It is, of course, impracticable to attempt to outline the present equipment, but suffice it to say that everywhere there are large easily read explanatory charts and such exhibits as a series of underground chambers simulating a coal mine with its different headings, equipped with mining machinery manned by full-sized wax figures of miners. There are working models of rolling mills; a full-size Bessemer converter, cut in half, with materials representing its lining and contents; an exhibit of locomotives from the first forms down to the modern types, of actual size, and in many cases arranged so that various details may be operated, as for studying the valve link motion. There are whole departments given over to acoustics, electricity and magnetism, telegraphy and telephony, photography, color printing, aeronautics, ship building, etc.

The new museum building will contain about 5¾ acres, not including 1 acre in vestibules, and it is intended that, besides the general features outlined, the building shall accommodate lecture rooms and laboratories and work rooms for manufacturing demonstration appliances, models, etc. The building itself is expected to cost about $3,500,000, and of this the city of Munich is to contribute

250,000; the Bavarian government, $500,000; the German Empire, $500,000, and German industry more than $500,000. In addition, German industrial establishments are supplying the various building materials, in some cases without cost. The interest in the Museum is indicated by the fact that at the present time it is being visited at the rate of 1000 a day. This includes large numbers coming to Munich for the purpose, particularly in the summer season. Schools visit the museum and associations of teachers from various parts of Germany, who look to it for suggestions for teaching. Trade and workmen's associations have also utilized the museum for instruction purposes. Visitors have come from Swiss grammar schools, Austrian workmen's associations, Russian primary teachers' associations, etc. It is expected that the museum will be more attractive than ever as a place for the meeting of scientific, technical and industrial corporations. M.

Wages and Cost of Living in Coal Mining

To the Editor: In *The Iron Age* of July 10 the editorial headed "A Peculiar Labor Situation," referring to coal mining operations, hits the nail squarely on the head. Representatives of the miners said as far back as twenty years ago that they would be satisfied if they could compel the operators to pay them enough per ton to make three or four days' work in a week give them a good living. It was not steady operation of the mines they wanted, but plenty of money to live on with as little work as possible. This feeling has not only prevailed among all union miners, but has extended to non-union miners as well. Few of the coal miners employed at two properties with which the writer is connected average over seven hours' work a day. Very few ever work a full week. It is a well-known fact that coal miners, especially in the West Virginia field, working nine hours a day, would make more money than any other semi-common laborers in the United States. An average miner can produce in either of the properties of the writer's company an average of three-quarters of a car an hour. Some actually do this much; the majority do not care to. The pay is from 75 cents to $1 per car. So much for the question of wages.

The high cost of living, in the West Virginia district of which I am writing, is more truly expressed by Mr. Hill when he speaks of "the cost of high living." In the town of ———— are five or six groceries, two general stores and a 5-cent and 10-cent store. Seventy-five per cent. of the trade of these stores comes from the employes of the ———— (coal mining) company. I mention this to stop all argument regarding monopoly by company store. In addition to the stores mentioned, the mining company has a store or commissary. There is not a single article for sale at the company's store that is not of the very best quality. The dry goods are such as will be found in any city store. Our colored miners and the colored women wear silk hose. It would be an impossibility to sell men's shoes for less than $5 retail—not a cheap shoe with the price raised to $5, but a shoe that would cost $5 in any city store.

More Stetson hats are sold to the men than all other hats combined. We could not sell a suit of ready-made clothing to any man in our employ, but must have tailors come twice a month to the store for measuring and taking orders. Clothing, shoes, socks, etc., are no higher priced today than they were 30 years ago. In fact they are lower, but the people in those days did not wear the quality the miners and their families insist on having now.

In the line of things not necessities, take smoking tobacco. Twenty years ago the miners used two brands of cheap Virginia tobacco which sold at 10 cents a package, or three packages for 25 cents. Today the miners in the locality of which I am writing use nothing but brands like "Tuxedo," "Prince Albert" and "William Penn," which are in smaller packages, the tobacco being put up in tin cases so as to be easily carried. The buyer, of course, pays for the tin and the fancy package and gets about one-third as much tobacco as in the old-time packages, at even a greater cost package for package. Mining stores used to sell innumerable stogies and what were known as "tips," which sold at two for a nickel. Now the mining store has little or no call for anything less than a five-cent cigar and many 10-cent cigars are sold.

It is very evident from the writer's observation that the high cost of living for workmen for the most part boils down to one thing: the tastes of the buyer are much more expensive today than formerly. B. H.

Industrial Depressions

To the Editor: I have just read the editorial in *The Iron Age* of August 21, entitled "A Short Corn Crop May Not Affect Business." This editorial comes nearer to telling the facts as they actually are than any I have read on the subject. In fact, it is so good that it only needs a little change to make it perfect.

You say, for instance, "While the partial failure of this crop will undoubtedly be severely felt by the people of the sections immediately interested, etc." Now the people "immediately interested" evidently means the people where the short crop is raised. In my book "Industrial Depressions," page 145, I demonstrate that the short corn crop of 1901 gave to the people who raised the crop $170,000,000 more money than they received for the large crop of 1900. It was not, therefore, the people who raised the short crop who *severely felt* it. It was the people who bought the corn, paying 60 cents per bushel for it instead of 35 cents per bushel paid the year before, who *severely felt* the shortage. Statistics show that they consumed as much per capita at 60 cents per bushel as they consumed the year before at 35 cents. It was, therefore, the people of the whole country who bought the crop and had $170,000,000 less money to spend than they had the year before, who *severely felt* the difference.

In my book "Industrial Depressions," will be found, from beginning to end, demonstrations of the falsity of many of the ordinary everyday theories universally accepted. For instance: Ask any banker what was the cause of the industrial depressions which occurred, as is generally believed, about 1837, 1857 and 1873. All will say the depressions were caused by panics which occurred about the same time. I have shown that in the first mentioned period the industries had fallen off 50 per cent. a year before the panic occurred; in the second period the shortage was greatest in 1854 and 1855, showing that the depression was a fact two or three years before the panic; in the third period the shrinkage commenced 21 months before the panic. GEO. H. HULL.

NEW YORK, August 25, 1913.

Rioting in Erie, Pa., Molders' Strike

Press dispatches from Erie, Pa., tell of a fresh outbreak of rioting in connection with the strike of iron molders in that city on Friday night, August 23. Two troops of the State constabulary arrived in Erie Saturday morning. Word had previously been sent to Governor Tener by the Central Labor Union of Erie that if troops were sent a general walkout would be ordered by the organized trades of Erie. A special meeting of the Central Labor Union was held Sunday, August 24, to make good this threat, but the executive committee took the view that a general strike would jeopardize the molders' strike and therefore the order was withheld. In the rioting of Friday night union molders, non-union molders and private detectives participated. A State policeman was wounded and three other participants are in the hospital, while other injured were taken to their homes. The strike of the molders in Erie began in December. Recognition of the union was demanded. Union machinists in some of the Erie shops are also out, the issues they raised growing in part out of the molders' strike.

Minnesota Steel Company Employees' Houses.—The Minnesota Steel Company, Duluth, has awarded a contract providing for the erection of 170 employees' houses to be built on a site near the works. Houses of several designs will be constructed, varying in cost from $800 to $1000. The type of construction is novel, calling for walls built of concrete blocks, designed to afford a double air space and also providing for concrete floors throughout. It is expected that a majority of the houses will be completed before winter.

S. DIESCHER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

The Iron and Metal Markets

Some Price Readjustments

Semi-Finished Steel More Plentiful

Large Buying of Steel-Making Iron—Standard Oil Company Again in the Market

The making of lower prices in recent transactions in certain finished steel products should not obscure the fact as to the volume of business in this end-of-the-summer period. The steel trade has shown, not so long ago, that it is no longer dependent on large railroad buying to make a good showing. It may be that it will be called upon to make such a demonstration again.

So far as the Steel Corporation's bookings are a criterion, August conditions have been better than expected. For the past two weeks, which have included a good foreign business, it has taken new orders at the rate of close to 30,000 tons a day. The prediction is now made that its August 31 report will show a falling off of about 250,000 tons, against a decrease of 408,000 tons in July and 517,000 tons in June.

Heavy buying of pig iron, particularly steel-making iron, both in the East and the Central West, has been a feature of the past week. Another situation in which a good deal of interest has centered is that resulting from the increasing supply of semi-finished steel available in the Central West, and the consequent readjustment in prices.

The Standard Oil Company has appeared as a buyer of tin plates, as well as of steel plates for the manufacture of lap weld pipe. It placed 100,000 boxes of tin plates with the American Sheet & Tin Plate Company. Its purchase in Wales last month was 30,000 boxes. As it has done for some years, it has contracted for pipe plates with the Steel Corporation and these will be converted into pipe of various sizes at the Pennsylvania Tube works of the National Tube Company.

Of the ado recently made in affirming and denying concessions from the 1.45c., Pittsburgh, price for plates and shapes it is to be said that there are no absolute prices to-day on finished materials, as there were none in the months of advances in 1912. In the past week the situation in plates has been easier, and in the Central West 1.40c. at mill has been done on deliveries within two weeks.

Structural steel is maintained at 1.45c., Pittsburgh, for the most part, though on a large contract, particularly on shipment into Eastern territory, this could be shaded. For the New York subway extensions 9700 tons has been let to the Pennsylvania Steel Company and 3500 tons to the American Bridge Company. The Chicago & Alton has placed 2000 tons for shops at Bloomington, Ill., and the C., H. & D. 1100 tons for a new bridge at Hamilton, Ohio. The rail bookings of the Steel Corporation mills have been about 20,000 tons in small amounts. In addition to the recent Tampa & Gulf Coast order for 5000 tons, an eastern mill has taken 1000 tons for the Florida East Coast.

Bar mills promise to make a new record in output this year. The only reported exception to the 1.40c., Pittsburgh, basis for steel bars is on the recent contracts with the largest harvesting machinery companies. These paid close to $2 a ton more than last year's contract level, and that was reported at the time (May, 1912) to be 1.20c., Pittsburgh. A late competitive development is the occasional waiving of the charge for twisting reinforcing bars.

Continued weakness in the rivet market has resulted in the shading of $1.90 on boiler rivets. Bolt and nut prices, which have been irregular for some weeks, show more uniformity though not greater strength.

The slowing down in sheet production has caused a surplus of semi-finished steel, and billets and sheet bars have been sold by smaller mills at lower prices than in a good many months, or $24 to $24.50, Pittsburgh and Youngstown, for open-hearth billets and $25 to $25.50 for sheet bars. Bessemer steel is not in like plentiful supply, and the market is about $1 a ton higher than the above quotations.

The week's basic pig iron sales in the East amount to 35,000 tons, including 30,000 tons to one steel company for delivery this year, at $15 delivered. In the Central West, three companies, including the Carnegie Steel Company, bought 35,000 to 40,000 tons of basic iron at $14 Valley furnace and 20,000 to 25,000 tons of Bessemer iron, mostly at $15.75 Valley furnace. The Steel Corporation is in the market for 10,000 tons of Bessemer iron.

Southern iron has been heavily sold in the past ten days to pipe foundries, and $11 is now firmly established for No. 2 foundry, with the tendency upward. Foundry iron is stronger in nearly all markets. A good-sized inquiry for malleable iron has come up at Chicago, and the General Electric Company is in the market for about 10,000 tons of foundry and malleable grades. The entire pig iron situation shows more strength.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous.

	Aug. 27, 1913.	Aug. 20, 1913.	July 30, 1913.	Aug. 28, 1912.
Pig Iron, Per Gross Ton:				
Foundry No. 2 X, Philadelphia	**$15.75**	$15.65	$15.50	$16.00
Foundry No. 2, Valley furnace	14.00	14.00	13.75	14.00
Foundry No. 2, S'th'n, Cin'ti	**14.25**	14.00	13.75	15.25
Foundry No. 2, Birmingham, Ala.	**11.00**	10.75	10.50	12.00
Foundry No. 2, furnace, Chicago*	15.00	15.00	14.75	15.50
Basic, delivered, eastern Pa	*15.00*	15.25	15.00	16.50
Basic, Valley furnace	14.00	14.00	14.35	14.00
Bessemer, Pittsburgh	16.65	16.65	16.40	15.65
Malleable Bessemer, Chicago*	15.00	15.00	14.75	15.50
Gray forge, Pittsburgh	14.25	14.25	14.40	14.40
Lake Superior charcoal, Chicago	**15.25**	15.00	15.25	16.25
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh	25.00	25.00	27.00	22.50
Open-hearth billets, Pittsburgh	*24.50*	25.00	27.00	23.00
Open-hearth sheet bars, Pgh	*25.00*	25.50	27.50	23.00
Forging billets, Pittsburgh	*30.00*	32.00	34.00	29.00
Open-hearth billets, Philadelphia	*27.00*	28.00	28.00	25.40
Wire rods, Pittsburgh	28.00	28.00	28.00	27.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	14.00	14.00	14.00	16.25
Iron rails, Philadelphia	17.50	17.50	17.50	16.50
Carwheels, Chicago	12.75	12.75	12.75	14.00
Carwheels, Philadelphia	**12.50**	12.00	12.00	14.00
Heavy steel scrap, Pittsburgh	12.25	12.25	12.25	13.75
Heavy steel scrap, Chicago	10.50	10.50	10.50	12.25
Heavy steel scrap, Philadelphia	11.50	11.50	11.25	14.50
Finished Iron and Steel, Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	*1.37½*	1.42½	1.42½	1.40
Iron bars, Pittsburgh	1.60	1.60	1.65	1.40
Iron bars, Chicago	1.40	1.40	1.50	1.40
Steel bars, Pittsburgh	1.40	1.40	1.40	1.30
Steel bars, New York	1.56	1.56	1.56	1.46
Tank plates, Pittsburgh	*1.40*	1.45	1.45	1.35
Tank plates, New York	*1.56*	1.61	1.61	1.56
Beams, Pittsburgh	1.45	1.45	1.45	1.35
Beams, New York	1.61	1.61	1.61	1.56
Angles, Pittsburgh	1.45	1.45	1.45	1.35
Angles, New York	1.61	1.61	1.61	1.56
Skelp, grooved steel, Pittsburgh	1.40	1.40	1.45	1.25
Skelp, sheared steel, Pittsburgh	1.45	1.45	1.50	1.30
Steel hoops, Pittsburgh	1.50	1.50	1.60	1.40
Sheets, Nails and Wire, Per Pound to Large Buyers:				
Sheets, black, No. 28, Pittsburgh	*2.15*	2.20	2.25	2.05
Wire nails, Pittsburgh	1.65	1.65	1.70	1.70
Cut nails, f.o.b. Eastern mills	1.75	1.75	1.75	1.70
Cut nails, Pittsburgh	1.60	1.60	1.65	1.60
Fence wire, ann'l'd, 0 to 9, Pgh.	1.45	1.45	1.55	1.50
Barb wire, galv., Pittsburgh	2.05	2.05	2.20	2.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

ke, Connellsville,	Aug. 27, 1913.	Aug. 20, 1913.	July 30, 1913.	Aug. 28, 1912.
Per Net Ton at Oven:				
rnace coke, prompt shipment	$2.50	$2.50	$2.50	$2.25
rnace coke, future delivery..	2.50	2.50	2.50	2.25
undry coke, prompt shipment	2.90	2.90	2.75	2.40
undry coke, future delivery..	3.00	3.00	3.00	2.50

tals,	Cents.	Cents.	Cents.	Cents.
Per Pound to Large Buyers:				
ke copper, New York.....	16.00	16.00	15.25	17.75
ectrolytic copper, New York..	15.62½	15.75	15.00	17.65
elter, St. Louis.....	**5.75**	5.70	5.45	7.05
elter, New York	**5.90**	5.85	5.60	7.20
elter, St. Louis	4.67½	4.67½	4.35	4.57½
ad, St. Louis	4.75	4.75	4.50	4.65
ad, New York	**42.60**	41.25	40.25	46.25
n, New York	7.75	7.75	7.75	7.87½
timony, Hallett, New York..	$3.50	$3.50	$3.60	$3.50
n plate, 100-lb. box, Pittsburgh				

inished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 New York, 16c.; Philadelphia, 15c.; Boston, 18c.; ffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, ½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; ew Orleans, 30c.; Birmingham, Ala., 45c.; Pacific ast, 80c. on plates, structural shapes and sheets No. and heavier, 85c. on sheets Nos. 12 to 16; 95c. on eets No. 16 and lighter; 65c. on wrought pipe and iler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. ide, 1.40c. to 1.45c., base, net cash, 30 days. Following e stipulations prescribed by manufacturers with ex-as:

Rectangular plates, tank steel or conforming to manufacturers' andard specifications for structural steel dated February 6, 1903, equivalent, ¼ in. and over on thinnest edge, 100 in. wide and der, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., e considered ¼-in. plates. Plates over 72 in. wide must be dered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to ke base price. Plates over 72 in. wide ordered less than 11 lb. per ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or eight, to be governed by the standard specifications of the Associaon of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.45c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Rods and Wire.—Bessemer, open-hearth and chain rods, $28 to $28.50. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.45; galvanized, $1.85. Galvanized barb wire, to jobbers, $2.05; painted, $1.65. Wire nails, to jobbers, $1.65.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.65	$1.70	$1.75	$1.80	$1.90	$2.00	$2.10	$2.20
Galvanized	2.10	2.10	2.15	2.20	2.30	2.40	2.80	2.90

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight), in effect from August 8, 1913, and iron pipe (full weight), from June 2, 1913:

Butt Weld.

Steel. Inches.	Black.	Galv.	Iron. Inches.	Black.	Galv.
⅛, ¼ and ⅜	73	52½	⅛ and ¼	66	47
½	77	66½	⅜	65	46
¾ to 3	80	71½	½	69	56
			¾ to 2½	72	61

Lap Weld.

2	76	67½	1¼	56	45
2½ to 6	78	69½	1½	67	56
7 to 12	75	64½	2	68	58
13 to 15	52	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted.

1 to 3, butt	78	69½	1 to 1½, butt	70	59
2, lap	74	65½	2, butt	70	59
2½ to 6, lap	76	67½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap	68	59

Butt Weld, extra strong, plain ends.

⅛, ¼ and ⅜	68	57½	⅜	63	52
½	73	66½	½	67	60
¾ to 1½	77	70½	¾ to 1½	71	62
2 to 3	75	71½	2 and 2½	72	63

Lap Weld, extra strong, plain ends.

2	73	64½	1½	65	59
2½ to 4	75	66½	2	66	58
4½ to 6	74	65½	2½ to 4	70	61
7 to 8	67	56½	4½ to 6	69	60
9 to 12	62	51½	7 and 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends.

½	63	56½	½	57	49
¾ to 1½	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends.

2	63	56½	2	55	49
2½ to 4	65	58½	2½ to 4	60	54
4½ to 6	64	57½	4½ to 6	59	53
7 to 8	57	46½	7 to 8	52	42

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads on lap-welded steel, in effect from May 29, 1913, and standard charcoal-iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap-Welded Steel.		*Standard Charcoal Iron.*	
1¼ and 2 in.	60	1½ in.	44
2¼ in.	57	1¾ and 2 in.	48
2½ and 2¾ in.	63	2¼ in.	44
3 and 3¼ in.	67	2½ to 2¾ in.	53
3½ to 4½ in.	69	3 and 3¼ in.	55
5 and 6 in.	63	3½ to 4½ in.	58
7 to 13 in.	60		

Locomotive and steamship special grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¼ in. and larger, over 22 ft., 10 per cent. net extra.
Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.60
Nos. 9 to 10	1.65
Nos. 11 and 12	1.70
Nos. 13 and 14	1.75
Nos. 15 and 16	1.85

Box Annealed Sheets, Cold Rolled.

Nos. 10 and 11	1.80 to 1.90
No. 12	1.80 to 1.90
Nos. 13 and 14	1.85 to 1.95
Nos. 15 and 16	1.90 to 2.00
Nos. 17 to 21	1.95 to 2.05
Nos. 22 and 24	2.00 to 2.10
Nos. 25 and 26	2.05 to 2.15
No. 27	2.10 to 2.20
No. 28	2.15 to 2.25
No. 29	2.20 to 2.30
No. 30	2.30 to 2.40

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	2.20 to 2.30
No. 12	2.30 to 2.40
Nos. 13 and 14	2.30 to 2.40
Nos. 15 and 16	2.45 to 2.55
Nos. 17 to 21	2.60 to 2.70
Nos. 22 and 24	2.75 to 2.85
Nos. 25 and 26	2.90 to 3.00
No. 27	3.05 to 3.15
No. 28	3.20 to 3.30
No. 29	3.35 to 3.45
No. 30	3.50 to 3.60

Pittsburgh

PITTSBURGH, PA., August 27, 1913.

More new business in pig iron, semi-finished steel and finished material has been placed in the past week or 10 days than in any similar period for some months. In some cases concessions have been made on what have been regarded for a long time as regular market prices. The pig iron market has been very active, with some notably heavy sales of Bessemer and basic, mostly for prompt shipment, but some for deliveries running to the end of the year. The slowing down in operations in some of the works, notably in the sheet mills, has caused a surplus of steel in the form of sheet bars and billets, which is being offered in the open market by the smaller steel mills at lower prices than have been named in a long time, and considerable business has been closed. The recent reduction in wire has stimulated the demand; a very heavy tonnage in wire nails and wire has been placed this month, but it is understood that on the very largest contracts the regular prices of $1.65 on wire nails and $1.45 on plain annealed wire were not strictly maintained. This is nothing new, however, as the largest trade has usually had the benefit of an inside price over the regular market when placing large contracts. In plates the situation is easier, and 1.40c. at mill can readily be done on deliveries within two weeks from date of order. The structural material market is well maintained at 1.45c. on general current orders, but on any large work this price can be shaded. The situation in steel bars is firm, and while the usual differential was probably allowed to two or three of the largest consumers on recent contracts, the bulk of the business now on the books of the mills is at the full price of 1.40c. at mill. Some heavy business in sheets and tin plate has recently been placed, the Standard Oil Company giving nearly 100,000 boxes to the local interest, despite efforts of foreign mills to secure this business. Bessemer black sheets have settled down to the basis of 2.15c. to 2.25c. and galvanized 3.20c. to 3.30c., and on the latter 3.15c. has been done, but this price is not general by any means. Leading makers of Bessemer and open-hearth billets and sheet bars are naming lower prices to meet increasing competition of the smaller mills. The $2.50 price on standard furnace coke is being held, but the coke makers are having trouble in getting business at this figure. There is a better feeling in the scrap trade, but as yet it is not reflected in an improvement in prices. The new demand for lap-weld and line pipe is the heaviest ever known in the history of the pipe trade, and leading mills are so filled up that they will probably carry a good deal of business over into next year. Signs are stronger of a heavier buying movement, but as yet all indications are that it will be confined to actual needs of consumers.

Pig Iron.—Heavy sales of both Bessemer and basic have been made. Bessemer iron is firmly established at $15.75, Valley furnace, with large sales at that price. Early last week a local steel company bought 5000 tons of basic for prompt delivery at $14, Valley furnace, and 6000 tons of Bessemer iron for September delivery at $15.75, Valley furnace. The same interest bought later 10,000 tons of basic for reasonably prompt delivery at $14. The Carnegie Steel Company has bought from the Pittsburgh Crucible Steel Company 10,000 tons of basic for prompt delivery at $14.25, Midland, Pa., this price figuring back to $14 at Valley furnace, Midland having a freight rate of 25c. lower than the valleys. A steel company located east of Pittsburgh has also bought 5000 to 10,000 tons of Bessemer iron to round out its requirements, having one of its blast furnaces off, at about $15.75, Valley furnace, but sold the maker of this iron a heavy tonnage of Bessemer ore to be shipped from its Mahoning mine. Efforts to obtain $14.10 and up to $14.25 for basic iron are unsuccessful, but the market is strong at $14 at furnace. A local steel company has a good deal of basic iron piled up at its blast furnace, and has been selling a part of this product for the reason that it was delayed in getting its open-hearth steel plant started. Some sellers are holding at $16 for Bessemer iron at which small sales have been made. There is a moderate inquiry for foundry iron, and No. 2 is firm at $14 at furnace, with some sellers asking $14.25 and $14.50. Small sales of gray forge have been made in the past week at $13.35 to $13.50, Valley furnace. While the pig iron market is more active, prices are slow to reflect the improvement. We quote: Bessemer, $15.75 to $16; basic, $14 to $14.25; malleable Bessemer, $13.75 to $14; No. 2 foundry, $14; gray forge, $13.35 to $13.50, all at Valley furnace, the freight rate for delivery to the Cleveland and Pittsburgh districts being 90c. a ton while the freight rate from the Midland, Pa., blast furnace is 6[illegible] a ton.

Billets and Sheet Bars.—A surplus of open-hearth steel is offered on the market by the smaller mills in the form of billets and sheet bars, and at lower prices than have been named for some months. Leading makers in the Pittsburgh and Youngstown districts are naming lower prices to meet this increased competition and are quoting Bessemer and open-hearth sheet bars at about $26, Youngstown or Pittsburgh, while smaller mills are quoting open-hearth sheet bars at $25 to $25.50, Pittsburgh. Two of the new 80-ton open-hearth furnaces in the new plant of the Carnegie Steel Company at Bessemer, Pa., have been started, and a third furnace will go on next week. Five of the eight open-hearth furnaces in the new plant of the Pittsburgh Crucible Steel Company at Midland, Pa., are in operation, and the other three will be started inside of 30 days. It will be seen that a good deal more open-hearth steel is coming on the market, and with the slowing down in operations among some of the finishing mills, the supply, notably in open-hearth stock, is larger than for some time. We quote open-hearth billets for prompt delivery, and also for shipment over remainder of the year at about $24.50 to $25; open-hearth sheet bars for the same deliveries at $25 to $25.50, delivered to buyers' mills in the Pittsburgh district. For billets and sheet bars made from Bessemer steel, the larger mills are asking about $1 a ton advance over these prices. We quote forging billets at $30 to $31, and axle billets at $26 to $27, maker's mill.

Steel Rails.—The Carnegie Steel Company reports that on standard sections and light rails it is practically sold up for the remainder of the year. This company is now rolling open-hearth rails at its Edgar Thomson mills at Bessemer, the first time this has ever been done, two of its new 14 open-hearth furnaces being in operation this week. Quite a number of small orders are being placed for standard sections, which aggregate a good tonnage, and light rails are also in active demand, new orders and specifications of the Carnegie Steel Company in the past week being about 2000 tons. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Plates.—The report that the Standard Oil Company had placed a contract with the United States Steel Corporation for 50,000 tons of plates for steel riveted pipe is incorrect. They will be made into lap-weld pipe by the National Tube Company. The Carbon Steel Company of this city is the low bidder on 3900 tons of specially treated protective deck plates for the new Government dreadnought to be built, its price having been $187.04 per ton. The statement in the daily press that this contract was for armor plate was incorrect as the Carbon Steel Company has never made any armor plate in its mills. The new demand for plates is fairly heavy, and specifications from the steel car companies are still active. New orders for steel cars in the past week have been light. The Cambria Steel Company took 60 steel gondolas for the Grand Rapids & Indiana Railway and the Lehigh Valley is in the market for bids for 20 steel canal boats for its canal line in eastern Pennsylvania. The Pressed Steel Car Company has taken 25 ore cars for the Bingham & Garfield Railroad and the Boston & Maine is taking bids on 1000 gondolas and 5000 center sills for car reinforcements, the latter contract calling for about 2500 tons of steel plates. The Union Pacific is in the market for 1500 freight cars, and the Swift Refrigerator & Transportation Company is building 250 refrigerator cars in its own shops and is in the market for 250 more. The market on plates is softer, and some of the mills are offering ¼ in. and heavier plates for delivery in two to four weeks at 1.40c. and universal plates in four to six weeks. We quote ¼ in. and heavier plates for prompt or forward delivery at 1.40c. to 1.45c., Pittsburgh.

Structural Material.—The past week has been quiet as to new work placed, but inquiries are active. The American Bridge Company has closed for 3000 to 4000 tons of bridge work for a Western road, and the McClintic-Marshall Construction Company has taken 300 tons for California work. Bids are expected to be out in a short time for the material for the new Masonic Temple to be built in this city, requiring 3000 to 4000 tons. Prices on plain material are fairly steady at 1.45c. for current orders, but on large contracts this price would be shaded. We continue to quote beams and channels up to 15 in. at 1.45c., Pittsburgh. Small

lots from warehouse for prompt delivery are bringing from 1.60c. up, depending on the size of the order and the deliveries wanted.

Wire Rods.—New inquiry for rods is a little more active, but prices have shown no improvement. We quote Bessemer open-hearth and chain rods at $28, Pittsburgh, but on a good contract this price would be shaded.

Ferroalloys.—The new price of $56, seaboard, for foreign 80 per cent. ferromanganese has not stimulated new business to any extent. Small lots are being offered at $55 for prompt shipment. It is undestood that progress is being made on the plans of a domestic producer to come in the market within 60 to 90 days with a good supply of ferromanganese for domestic consumers. As yet the identity of this interest has not been given out. We quote 80 per cent. foreign ferromanganese at $55 to $56, seaboard, the freight rate to the Pittsburgh district being $2.16 a ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $75; over 100 tons to 600 tons, $74; over 600 tons, $73, Pittsburgh.

Skelp.—The new demand is active. The skelp mills are well filled up for the remainder of the year. A local maker reports a sale of about 2000 tons of grooved steel skelp at about 1.35c., delivered at buyer's mill. We quote grooved steel skelp, 1.40c. to 1.45c.; sheared steel skelp, 1.45c. to 1.50c.; grooved iron skelp, 1.65c., to 1.75c.; sheared iron skelp, 1.70c. to 1.75c., all delivered to buyers' mills in the Pittsburgh district. We note a sale of 1000 tons of grooved steel at 1.40c. delivered.

Iron and Steel Bars.—Local mills state that on nearly all of the large contracts for steel bars recently placed by implement makers and other leading consumers the full price of 1.40c., Pittsburgh, was obtained, but to several of the largest implement makers who placed very heavy contracts running over a year or more the usual differential over the regular price was allowed, which has been the custom for many years. The new demand for steel bars is only fair, most consumers being covered into next year. Specifications against contracts are coming in at a moderate rate. Three of the largest makers of steel bars state that they are practically sold up for the remainder of this year. Iron bars are quiet. The mills have caught up pretty well on back orders and are now able to make prompt deliveries. We quote steel bars for forward delivery at 1.40c. and for shipment from warehouse in small lots at 1.90c. We quote iron bars at 1.60c. to 1.70c. The mills continue to charge $1 extra per ton for twisting ¾-in. and larger steel bars and $2 extra for ½ to ⅝ in. In some cases, however, these extras are being shaded.

Sheets.—New buying in black and galvanized sheets has been quite heavy in the past two or three weeks, and the mills have entered a large amount of business for delivery over the remainder of this year and into the first quarter of next. New mills have been going after orders aggressively. On desirable business No. 28 black has sold at 2.15c. and 28 galvanized at 3.15c., but the latter price is not general. We quote Nos. 9 and 10 blue annealed sheets at 1.65c.; No. 28 Bessemer black, 2.15c. to 2.25c.; No. 28 galvanized, 3.20c.; No. 28 tin mill black plate, 2.15c. to 2.20c., and No. 30, 2.20c. to 2.25c. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—The report that the Standard Oil Company had placed 50,000 tons of tin plate, equal to 1,000,000 boxes, with foreign mills, is incorrect. Recently this interest came in the market for close to 100,000 boxes, but the order was taken by the American Sheet & Tin Plate Company and did not go abroad. The new demand is quiet, as most consumers are covered, but specifications are coming in freely. The leading interest is now making the largest shipments in its history of both tin plate and sheets and is operating to 85 per cent. of tin plate capacity. We quote 100-lb. cokes at $3.50 to $3.60, and 100-lb. ternes at $3.35 to $3.45, Pittsburgh.

Spikes.—There is a little more new inquiry, but not much business is being placed, and specifications from the railroads are quiet. We quote railroad spikes in base sizes, 5½ x 9/16 in., at $1.65 to $1.70, and small railroad and boat spikes in carload and larger lots at $1.75 to $1.80 per 100 lb., f.o.b. Pittsburgh.

Wire Products.—Since the recent reduction in prices of wire products, very heavy contracts for wire nails and wire have been placed for extended delivery, but it is stated that from the largest jobbers the full price of $1.65 on wire nails and $1.45 on plain annealed wire was not obtained in all cases. To the general trade, however, the new prices are being well maintained. It is believed that about September 1, or shortly after, there will be an advance in prices of wire products in order to stimulate specifications against the heavy contracts recently placed. We quote: Wire nails to jobbers, $1.65; cut nails, $1.60; plain annealed wire, $1.45; galvanized barb wire, $2.05, and painted barb wire, $1.65, f.o.b. Pittsburgh, per 100 lb., usual terms, actual freight added to point of delivery.

Bolts and Rivets.—Several local makers state they are quite busy, current orders coming in freely for small lots, which amount to considerable tonnage, but consumers are buying only for current wants. Prices on rivets, bolts and nuts are being shaded on desirable orders. We quote button-head structural rivets at $2 and cone-head boiler rivets at $2.10 in large lots, terms 30 days net, less 2 per cent. for cash in 10 days. Regular discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 10% off
Small carriage bolts, cut threads	75 and 5% off
Small carriage bolts, rolled threads	75 and 10% off
Large carriage bolts	70 and 2½% off
Small machine bolts, cut threads	75 and 10% off
Small machine bolts, rolled threads	75, 10 and 5% off
Large machine bolts	70 and 7½% off
Machine bolts with C.P.C. and T nuts, small	75 and 5% off
Machine bolts with C.P.C. and T nuts, large	70% off
Square hot pressed nuts, blanked and tapped	$5.70 off list
Hexagon nuts	$6.30 off list
C.P.C. and R. square nuts, tapped and blank	$5.70 off list
Hexagon nuts, ⅝ and larger	$6.60 off list
Hexagon nuts smaller than 9/16	$7.20 off list
C.P. plain square nuts	$5.20 off list
C.P. plain hexagon nuts	$5.50 off list
Semi-finished hexagon nuts, ⅝ and larger	85% off
Semi-finished hex. nuts smaller than 9/16	85 and 10% off
Rivets, 7/16 x 6½, smaller and shorter	75, 10 and 10% off
Rivets, metallic tinned, bulk	3½c. per lb. net extra
Rivets, tin plated, bulk	1½c. per lb. net extra
Rivets, metallic tinned, packages	70, 10 and 10% off
Standard cap screws	75, 10, 10 and 7½% off
Standard set screws	75, 10, 10 and 7½% off

Shafting.—The new demand is only fair and mostly in small lots, but the tone of the market is firmer, several makers refusing to meet the extreme prices named recently. Regular discounts on cold-rolled shafting are 60 off in carload lots and 55 in small lots, but on desirable orders 62 is still being quoted.

Hoops and Bands.—Nearly all consumers being covered for some time ahead, the new demand is quiet. Specifications against contracts are coming in at a fair rate. We quote steel hoops at 1.50c. and bands at 1.40c. with extras as per the steel bar card.

Merchant Steel.—There is a fair amount of new buying, but it is mostly in small lots, consumers not desiring to anticipate, as prices are only fairly strong and indications are they may be lower. Nominal prices are as follows: Iron finished tire, 1½ x ½ in. and larger, 1.40c., base; under 1½ x ½ in., 1.55c.; planished tire, 1.60c.; channel tire, ¾ to ⅞ and 1 in., 1.90c. to 2c.; 1⅛ in. and larger, 2c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.75c.; concave and convex, 1.80c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.85c. We quote cold rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Standard Pipe.—The Standard Oil Company has placed orders with the National Tube Company for 55,000 tons of steel pipe of various sizes for extended delivery, and the latter has also taken a contract from a natural gas company for 10 miles of 20-in. pipe for delivery in Ohio. The new demand for lap-weld and line pipe continues heavy, and in spite of the fact that shipments by the mills are at high water mark, their obligations are getting heavier right along. Discounts on both iron and steel pipe are reported as being well maintained.

Coke.—Last week there were a number of suspensions of shipments on contracts, with the result that a good deal of standard furnace coke loaded on cars had to be moved, and in some cases this coke sold as low as $2.25 per net ton on track. The leading coke producers are still holding furnace coke firm at $2.50, but there is practically no demand. The output of coke has increased considerably of late, and unless the new demand soon improves the trade here is doubtful that the $2.50 price can be maintained. We continue to quote standard makes of furnace coke for prompt and forward delivery at $2.50, and foundry at $2.90 to $3 per net ton at oven. The Connellsville Courier reports

the output of coke for the week ending August 16 as 396,617 tons, an increase over the previous week of 4000 tons.

Boiler Tubes.—Heavy orders for locomotive and merchant tubes continue to be placed, and the mills are considerably behind in delivery. Discounts are reported as being firmly held.

Old Material.—The tone in scrap is perhaps a little stronger, but prices are not actually higher. Prices on most grades have reached such a low point that some dealers are now commencing to pile their scrap in preference to selling it on the present market. We note sales during the week of 4000 to 6000 tons of selected heavy steel scrap at $12.75 to $13, delivered at buyer's mills; also 500 tons of bundled sheet scrap at $8.25, delivered, and 400 tons of borings at $8.25, delivered. There is more inquiry from consumers than for some time. Dealers quote as follows, per gross ton, for delivery in the Pittsburgh district:

Selected heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	$12.75 to $13.00
Ordinary steel scrap	12.25 to 12.50
Compressed side and end sheet scrap	10.50
No. 1 foundry cast	12.75 to 13.00
No. 2 foundry cast	11.50 to 11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.00 to 8.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	14.50 to 14.75
No. 1 railroad malleable stock	11.50 to 11.75
Grate bars	8.25 to 8.50
Low phosphorus melting stock	15.75 to 16.00
Iron car axles	24.50 to 25.00
Steel car axles	17.50 to 17.75
Locomotive axles, steel	21.00 to 21.50
Locomotive axles, iron	25.50 to 26.00
No. 1 busheling scrap	12.00 to 12.25
No. 2 busheling scrap	7.50 to 7.75
Old carwheels	13.75 to 14.00
*Machine shop turnings	6.75 to 7.00
*Cast-iron borings	8.25 to 8.50
†Sheet bar crop ends	14.00 to 14.25
Old iron rails	14.50 to 14.75
No. 1 railroad wrought scrap	13.75 to 14.00
Heavy steel axle turnings	9.00 to 9.25
Stove plate	8.25 to 8.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Chicago

CHICAGO, ILL., August 27, 1913.—(*By Telegraph.*)

On the basis of a weekly review of developments, there is little of interest to report in this market, yet in comparison with conditions existing over a longer period it is believed that trade shows some betterment. Increase in specifications against contracts evidences the fact that consumers are using materials on schedules which are satisfactory to the producers. Bars show improvement in both steel and iron, and, while little new business is to be reported on the former, the principal interests are well taken care of with contracts. Generally the market is firm though quiet. The extent of this period of dullness will doubtless be limited by the ability of the railroads to postpone their purchases but there is evidence that these interests must get into the market on some items without much longer delay. The mills are accepting the situation, believing that under immediate conditions an increase in orders could not be obtained through a lowering of prices. Buyers are specifying freely for iron which has already been purchased, though new business is light. Structural material is in fair demand, the volume being obtained from small scattered tonnages. The scrap market is very quiet and slightly lower quotations on a number of items will be noted.

Pig Iron.—One of the leading implement interests has out inquiries for from 6000 to 8000 tons of iron to be used at its various plants. Aside from this particular instance, there are no inquiries of size reported. There has been considerable quiet trading for small lots of about 100 tons and fair sales on special analysis iron, one of the more recent transactions totaling 1000 tons. One feature which is favorably regarded is the fact that melters are specifying freely against their previous purchases, and it is probable that in many cases where conservatism has marked inquiries it will be necessary to make additional purchases. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4	$15.25 to $16.25
Northern coke foundry, No. 1	15.50 to 16.00
Northern coke foundry, No. 2	15.00 to 15.50
Northern coke foundry, No. 3	14.50 to 15.00
Southern coke, No. 1 foundry and No. 1 soft	15.60 to 16.10
Southern coke, No. 2 foundry and No. 2 soft	15.10 to 15.60
Southern coke, No. 3	14.60 to 15.10
Southern coke, No. 4	14.10 to 14.60
Southern gray forge	14.10 to 14.60
Southern mottled	13.85 to 14.35
Malleable Bessemer	15.00 to 15.50
Standard Bessemer	18.40
Basic	15.00 to 15.50
Jackson Co. and Kentucky silvery, 6 per cent.	18.40
Jackson Co. and Kentucky silvery, 8 per cent.	19.40
Jackson Co. and Kentucky silvery, 10 per cent.	20.40

(By Mail)

Rails and Track Supplies.—The usual amount of small business is providing a volume which is satisfactory to producers, considering existing circumstances. One feature of interest is the continued insistence by railroads for immediate shipment of what they buy, showing that their stocks are extremely lean. The market is firm at quoted prices, and there seems no likelihood of changes in the immediate future. We quote standard railroad spikes at 1.75c. to 1.80c., base; track bolts with square nuts, 2.25c. to 2.30c., base, all in carload lots, Chicago; tie plates, $32 to $34, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—The volume of structural business which is being had consists of small orders which form an aggregate sufficient to keep the fabricators comfortable. The Union Iron Works has a contract for 100 tons to be used in a normal school building at Los Angeles, Cal. The American Bridge Company will supply 1200 tons for a by-product building for the coke plant of the Minnesota Steel Company, New Duluth, Minn. The Central Iron Works will supply 190 tons for the Heesman-Hoffman building, Oakland, Cal. The McClintic-Marshall Construction Company will fabricate 300 tons for extensions to the plant of the Southern California Edison Company, Long Beach, Cal. The Chicago Steel Products Company has a contract for 437 tons to be used in extension of the Northwestern Elevated Railroad Company's platforms in Chicago and an order for 179 tons to be used in a power house being constructed for the Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Iowa. The construction of the George A. Joslyn building, Omaha, Neb., requiring 407 tons, as previously reported, has been changed to reinforced concrete construction. We quote for Chicago delivery from mill, 1.63c.

Orders for structural material out of store are confined to small lots, but are of a satisfactory tonnage. We quote for Chicago delivery, from store, 1.95c.

Bars.—Specifications for steel bars are coming along well, and while the amount of new business which is being obtained is rather light just now the mills are well taken care of and inclined to view the situation cheerfully. Reinforcing bars are in especially strong demand, though not of sufficient volume to seriously affect deliveries. The bar-iron situation is somewhat improved over last week, a very satisfactory amount of smaller orders being reported. Railroad buying is still the factor which is lacking to make a strong market, and with the prospect that these interests will be forced to buy soon on account of the conditions of their stocks there is little tendency to make concessions beyond the prices quoted below. On smaller sizes the mills are well taken care of, though prompt deliveries on the larger materials are easily obtainable. We quote for mill shipment as follows: Bar iron, 1.40c. to 1.45c.; soft steel bars, 1.58c.; hard steel bars, 1.50c.; shafting in carloads, 60 per cent. off; less than carloads, 55 per cent. off.

Out of store the demand for bars is good, with special reference to those used for reinforcing purposes. Prices are firm. For delivery from store we quote soft steel bars, 1.85c.; bar iron, 1.85c.; reinforcing bars, 1.85c. base, with 5c. extra for twisting in sizes ½ in. and over, and usual card extras for smaller sizes; shafting 53 per cent. off.

Plates.—The new demand is quite small, with a resultant betterment in deliveries. Mills are fairly well taken care of by contracts, and no concessions are being made from quoted prices. As a matter of fact, it is generally conceded that no additional tonnage could be induced by a lowering of prices, and such a change is therefore not considered in this territory. The producers are accepting existing conditions as nat-

ural and are firm in their belief that an increase in orders will soon be forthcoming. We quote for Chicago delivery, from mill, 1.63c.

The store demand for plates is quiet, without change in the previous quotation of 1.95c.

Cast Iron Pipe.—Contracts in this territory are confined to small lots and the new inquiry is reported light. The Massillon Iron & Steel Company has a contract for 1600 tons for Kenmore, Ohio. Pittsburg, Kan., has placed an order with the United States Cast Iron Pipe & Foundry Company for 300 tons. Bids for 900 tons will be opened in Minneapolis, Minn., to-day. No change of prices is reported. We quote as follows per net ton, Chicago: Water pipe, 4-in., $28; 6 to 12-in., $26; 16-in. and up, $25, with $1 extra for gas pipe.

Wire Products.—Increased orders are reported in this territory at the market prices which are now ruling. The stocks of jobbers are quite low. However, the buying is still marked by conservatism. Prices to jobbers are as follows: Plain wire, No. 9 and coarser, base, $1.63; wire nails, $1.83; painted barb wire, $1.83; galvanized, $2.20; polished staples, $1.83; galvanized, $2.15, all Chicago.

Sheets.—Considerable business is being had in sheets, with special reference to galvanized and blue annealed. On the other hand, the mills are aggressively seeking contracts for immediate delivery, and the opinion is expressed that with a fair amount of spot orders the market will show much greater firmness, as contracts for future delivery are of satisfactory proportions. While concessions may be made to induce these prompt shipment orders, there is no tendency to seek heavy bookings for future delivery on the same basis. We quote for Chicago delivery, from mill: No. 10 blue annealed, 1.83c. to 1.88c.; No. 28 black, 2.38c. to 2.43c.; No. 28 galvanized, 3.43c. to 3.48c.

Mill deliveries continue to affect the demand from store, though no further concessions in price have been made by the jobbers. We quote for Chicago delivery, from store, No. 10 blue annealed, 2.15c.; No. 28 black, 2.75c.; No. 28 galvanized, 4c.

Old Material.—The market is quiet in this territory and without particular interest. Buying by consumers continues to be confined to actual wants, while many dealers are not pressing sales at the ruling quotations except where necessary to dispose of material already contracted for. A small list from the Chicago & Alton Railroad was closed to-day. Other railroad offerings include a list of 1200 tons from the Baltimore & Ohio, 2500 tons from the Chicago, Burlington & Quincy and 4000 tons from the Rock Island, of which 400 tons is No. 1 rail. Little change is noted in prices, some few items having declined slightly during the week. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.

Old iron rails	$14.00 to $14.50
Old steel rails, rerolling	12.00 to 12.50
Old steel rails, less than 3 ft.	11.25 to 11.75
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	12.75 to 13.25
Heavy melting steel scrap	10.50 to 11.00
Frogs, switches and guards, cut apart	10.50 to 11.00
Shoveling steel	10.25 to 10.50
Steel axle turnings	7.25 to 7.75

Per Net Ton.

Iron angles and splice bars	$13.50 to $14.00
Iron arch bars and transoms	13.75 to 14.25
Steel angle bars	10.00 to 10.25
Iron car axles	20.25 to 20.75
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.00 to 10.50
Cut forge	10.00 to 10.50
Steel knuckles and couplers	10.25 to 10.50
Steel springs	10.50 to 11.00
Locomotive tires, smooth	11.75 to 12.25
Machine shop turnings	4.90 to 5.15
Cast and mixed borings	5.00 to 5.50
No. 1 busheling	8.75 to 9.25
No. 2 busheling	6.75 to 7.25
No. 1 boilers, cut to sheets and rings	7.25 to 7.75
Boiler punchings	10.50 to 11.00
No. 1 cast scrap	10.75 to 11.25
Stove plate and light cast scrap	9.50 to 10.00
Railroad malleable	10.25 to 10.75
Agricultural malleable	9.25 to 9.75
Pipes and flues	8.00 to 8.25

Rivets and Bolts.—With the placing of contracts by the implement interests, the most serious feature as regards prices on bolts and rivets is removed and they are now steadier, though manufacturers are still aggressively seeking new business at the ruling figures. Orders show a slight increase over the previous week, and structural rivets are still especially in demand. We quote from mill as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 75-10-7½; cut thread, 75-12½; larger sizes, 70-12½; machine bolts up to ⅜ x 4 in., rolled thread, 75-10-12½; cut thread, 75-10-7½; large size, 70-10-5; coach screws, 80-12½-5; hot pressed nuts, square head, $6 off per cwt.; hexagon, $6.70 off per cwt. Structural rivets, ¾ to 1¼ in., 2.03c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ¾ x 4 in., 70-7½; larger sizes, 65-5, carriage bolts up to ⅜ x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, $5.30, and hexagon, $5.90 off per cwt.

Philadelphia

PHILADELPHIA, PA., August 26, 1913.

Heavy basic pig-iron buying has been the feature of the market. One consumer in this district took upward of 30,000 tons for fourth quarter delivery. Continued activity prevails in foundry grades at steadily advancing prices. Some lines of finished material show more activity. One Eastern plate mill has had an exceptionally good week. More structural material business is in sight. Further good business in ship material, aggregating some 5000 tons, is before the trade. One large sale of rolling billets has been made. Bars are inclined toward weakness. Old material is sentimentally stronger, reflecting the increased activity in other districts. Coke is quiet, but prices appear well maintained.

Pig Iron.—The purchase of 30,000 tons of basic pig iron for delivery over the last quarter of the year by the Lukens Iron & Steel Company was the leading transaction of the week. Definite inquiries came out on this business the middle of last week and practically the entire purchase was closed before the week end. The tonnage was divided among a number of eastern Pennsylvania merchant furnaces at $15, delivered. While this price is lower than recent quotations the quantity involved as well as the customer had considerable bearing on the transactions and makers now state that the purchase could not be duplicated. A sale of 500 tons of prompt basic, central Pennsylvania delivery, was made at $15.25, delivered. A fair volume of business is moving in other steel-making grades. Two lots of Lebanon Valley low phosphorus, one 1000 and one 3000 tons, the latter for Western shipment, were sold at about $18 at furnace. Moderate sales of standard analysis low-phosphorus pig iron continue to be made at $23 to $23.50, delivered in this vicinity. A very fair volume of small lot business continues to be done in the higher foundry grades. In a number of instances aggregate sales show a larger volume than those of the previous week and usually at higher average prices. Few individual sales exceed 200 tons. Standard brands of eastern Pennsylvania No. 2 X foundry are now more firmly established on a minimum of $15.75, delivered here. The bulk of the sales are made at a range of $15.75 to $16, delivered, although sellers who have been maintaining a relatively higher basis, in instances up to $16.75 delivered, are taking a fair amount of non-competitive business. The encouraging feature of the situation is the coming into the market of some of the larger consumers. The Baldwin Locomotive Works, recently inquiring for 1000 to 2000 tons of foundry iron, has put out a further inquiry for 2000 to 4000 tons, and some of the other large buyers show indications of coming into the market. Cast-iron pipe makers have been moderate buyers of both Virginia and Northern low-grade iron. Northern low grade is being held at $15, delivered at Delaware River points. A good movement in the higher grades of Virginia foundry continues, while the bulk of the sales have been in lots running up to a few hundred tons at $13 to $13.25 at furnace for No. 2 X, sales in 1000-ton lots for delivery over the remainder of the year have been made at the inside price. One Virginia seller still holds at $13 at furnace for either No. 2 X or 2 plain, and has made good sales in both grades. Several moderate inquiries for rolling mill forge iron have been before the trade, but the demand is not active. Merchant producers in this district, a number of whom have heavily reduced production, are not forcing sales at present prices, and in instances competition for large lot business has not been so keen. As a rule order books are in much more favorable shape. Prices are much steadier and the tendency is upward. For delivery in buyers' yards in this district the following range of prices is named for shipment over the remainder of the year:

Eastern Pennsylvania No. 2 X foundry	$15.75 to $16.00
Eastern Pennsylvania No. 2 plain	15.50 to 15.75
Virginia No. 2 X foundry	15.80 to 16.25
Virginia No. 2 plain	15.75 to 16.00
Gray forge	14.75 to 15.00
Basic	15.00 to 15.25
Standard low phosphorus	23.00 to 23.50

Iron Ore.—Business is practically at a standstill. Importations from August 16 to 20 included 2400 tons from Venezuela, 6500 tons from Sweden and 12,300 tons from St. John.

Ferroalloys.—Eighty per cent. ferromanganese continues to be officially quoted at $56, seaboard, but little business is being done, consumers awaiting developments. While sales at lower figures are occasionally heard of they are believed to be resale transactions of material coming in at old low quotations. Ferrosilicon remains inactive.

Billets.—A sale, variously reported as 5000 to 10,000 tons, of basic open-hearth rolling billets has been made to the leading interest for one of its mills in this district and a local producer is credited with the sale. Current business in billets, either rolling or forging, has been extremely light. Ordinary basic open-hearth rolling billets, for delivery in this district, are quotable at about $27, with forging billets at about $33 minimum.

Plates.—The volume of new business has been larger. One Eastern mill reports a surprisingly large run of business, almost doubling the tonnage of the previous week. Reports of easier prices continue. It is understood that some of the smaller Western mills have reduced quotations to 1.40c., Pittsburgh, but some of the Eastern mills continue to book a very satisfactory amount of business at 1.60c., delivered here. On large lots weakness is more pronounced. Inquiries are out for 3000 tons of plate for line pipe in the South. Ship plate inquiries aggregate some 3500 tons. There is a good demand for structural and boiler plates in moderate quantities. A sale of 5000 tons of plates for Western shipment is noted, but the price is not disclosed.

Structural Material.—While it is stated that a considerable volume of new business is in sight actual inquiries of importance are light. The Pennsylvania Steel Company has the award for 10,000 tons of structural work in Brooklyn, in connection with elevated railroads. Some fair bridge contracts are reported, including one of several thousand tons. The steel contract for a power plant at Williamsburg, 350 tons, has been placed with a local fabricator. The price situation is by no means strong, although on current small orders, which represent the bulk of the trade, 1.60c. delivered is still quoted.

Sheets.—Western sheets are easier, 1.80c. delivered here being quoted for No. 10 blue annealed, although on small lots up to 1.90c. is obtained for either Eastern or Western sheets. The volume of business coming to the Eastern mills is smaller, although they are still comfortably fixed as to orders on their books.

Bars.—Business has been rather quiet. On ordinary iron bars quotations down to 1.37½c. delivered here are reported. The leading mills, however, maintain prices at 1.42½c., and even higher prices are obtained for the better grades. Mills, in instances, are becoming more anxious for business. The steel bar situation is unchanged.

Old Material.—While there is a decidedly better feeling in the market, the volume of business has been small. Holders of material are encouraged by improved conditions in other branches of the trade and are disinclined to sell at present prices. Heavy melting steel has been sold at $11.75, delivered, in 500-ton lots, but a large lot could scarcely be moved at $12. Some consumers still refuse to pay over $11.50. Wrought-iron scrap is stronger on small sales. Old carwheels are firmer, but there has been practicaly no movement in borings or turnings. Quotations are still somewhat irregular and to a large extent nominal; an approximate range for delivery in buyers' yards in this district, covering eastern Pennsylvania, taking freight rates varying from 35c. to $1.35 per gross ton, is as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Old steel rails, rerolling (nominal)	14.00 to 14.50
Low phosphorus heavy melting steel scrap (nominal)	15.50 to 16.00
Old steel axles (nominal)	17.50 to 18.00
Old iron axles (nominal)	25.00
Old iron rails	17.50 to 18.00
Old carwheels	12.50 to 13.00
No. 1 railroad wrought	14.50 to 15.00
Wrought-iron pipe	11.00 to 11.50
No. 1 forge fire	9.75 to 10.25
No. 2 light iron (nominal)	6.00
No. 2 cut busheling (nominal)	8.00 to 8.25
Wrought turnings	8.00 to 8.50
Cast borings	8.00 to 8.25
Machinery cast	12.75 to 13.25
Grate bars, railroad	9.00 to 9.50
Stove plate	9.00 to 9.50
Railroad malleable (nominal)	11.00 to 11.50

Coke.—A moderate volume of business has been done in both prompt and contract foundry coke. Small contracts are being made at about $3 at oven, although as high as $3.15 has been paid. Little business of importance is reported in furnace coke. Makers hold at $2.50 at oven for contract furnace coke, while small sales of spot coke have been made at the same basis. The following range of prices, per net ton, is named for delivery in buyers' yards, in this vicinity:

Connellsville furnace coke	$4.25 to $4.65
Connellsville foundry coke	4.90 to 5.35
Mountain furnace coke	4.00 to 4.25
Mountain foundry coke	4.50 to 4.75

Cincinnati

CINCINNATI, OHIO, August 27, 1913.—(*By Telegraph.*)

Pig Iron.—A number of the local foundries have resumed operations, following a settlement with the molders, who have been out on a strike several weeks. Hardly enough time has elapsed to bring out any local demand for pig iron, although it is reported that there will soon be considerable buying for last quarter shipment. Outside inquiries are also scarce, but an improvement is noted over the record for last week. Practically all inquiries and orders are for limited tonnages of foundry grades. An Illinois melter is negotiating with several sellers for approximately 8000 tons of foundry and malleable to be shipped in the next six months. A Michigan manufacturer is asking for 500 tons of low phosphorus iron for this year's shipment. Approximately 1000 tons of foundry iron is wanted by a Virginia melter, and nearby inquiries include one for 300 tons of No. 2 foundry for prompt delivery. A sale of 1500 tons of Northern foundry and 500 tons of charcoal iron was made to a central Ohio consumer, with deliveries extended into the first quarter of next year. The outside carload foundry business is on the increase, but practically all orders are placed quietly and without much shopping around. Southern prices are firmer, and with the possible exception of a small quantity of resale iron nothing below $11, Birmingham, can be done. Although $14, Ironton, is the minimum quotation on No. 2 foundry, speculative holders are understood to have shaded this on small lots. Basic is quiet and unchanged at $14, Ironton. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$14.75 to $15.25
Southern coke, No. 2 foundry and 2 soft	14.25 to 14.75
Southern coke, No. 3 foundry	13.75 to 14.25
Southern, No. 4 foundry	13.25 to 13.50
Southern gray forge	12.75 to 13.25
Ohio silvery, 8 per cent. silicon	18.20 to 18.70
Southern Ohio coke, No. 1	16.20 to 16.70
Southern Ohio coke, No. 2	15.20 to 15.70
Southern Ohio coke, No. 3	14.95 to 15.45
Southern Ohio malleable Bessemer	15.20 to 15.45
Basic, Northern	15.20 to 15.45
Lake Superior charcoal	16.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(*By Mail*)

Coke.—It is rumored that the uniform quotation of $2.50 per net ton at oven had been shaded on a small lot of Connellsville 48-hr. coke for prompt shipment, but if any was thus sold it was not a recognized standard brand. While little business is under negotiation in this territory the resumption of work in the local foundries will doubtless bring out a better demand for foundry coke, which is quoted around $3 to $3.25 at oven in the Connellsville and Pocahontas districts, but some Wise County 72-hr. brands can be contracted for around $2.75 at oven for any shipment this year, although the majority of producers in that field are holding out for $3. The average price of furnace coke is $2.50 per net ton in all three fields for any shipment this year.

Finished Material.—An improvement is noted in the warehouse demand for both structural material and sheets. The local sheet mill reports its order books in excellent shape, due to the receipt of a large amount of business that has come in within the past few days. Warehouse prices have not responded to reductions on a number of mill products recently reported, and slim stocks on hand indicate that present quotations will rule for some time. We quote steel bars from warehouse stocks at 1.95c. to 2c., and structural material, cut to lengths when desired, from 5c. to 10c. per 100 lb. higher. No. 10 blue annealed sheets are sold from stock at 2.20c. to 2.25c.

Old Material.—The settlement of the local molders' strike has not yet brought out any strong local demand for scrap material. Although this may have some effect on No. 1 cast scrap next week other grades will doubtless remain quiet. Prices generally are soft, and while no change can be made this week it is understood that a reduction of 25c. a ton more nearly represents

the market. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' quotations f.o.b. at yards:

	Per Gross Ton	
Bundled sheet scrap	$7.25 to	$7.75
Old iron rails	12.25 to	12.75
Relaying rails, 50 lb. and up	19.75 to	20.25
Rerolling steel rails	11.25 to	11.75
Melting steel rails	9.50 to	10.00
Old carwheels	11.00 to	11.50
Per Net Ton		
No. 1 railroad wrought	$9.25 to	$9.75
Cast borings	4.75 to	5.25
Steel turnings	4.75 to	5.25
No. 1 cast scrap	9.00 to	9.50
Burnt scrap	6.50 to	7.00
Old iron axles	16.75 to	17.25
Locomotive tires (smooth inside)	10.25 to	10.75
Pipes and flues	6.00 to	6.25
Malleable and steel scrap	7.50 to	8.00
Railroad tank and sheet scrap	4.75 to	5.25

Cleveland

CLEVELAND, OHIO, August 26, 1913.

Iron Ore.—Ore is moving at a satisfactory rate, although shipments from the Great Northern docks at Superior, which were interfered with by the recent strike, are not yet normal. The Great Northern Railroad has announced increase in wages of 15c. a day, to take effect next Monday. This advance is expected to attract experienced men to the docks and to have a beneficial effect upon loading operations, which have been slow at this company's dock since the strike, because of the employment of inexperienced men. Shipments in August will show up well, although they are expected to fall considerably short of the record breaking movement of July. We quote prices as follows: Old Range Bessemer, $4.40; Mesaba Bessemer, $4.15; old range non-Bessemer, $3.60; Mesaba non-Bessemer, $3.40.

Pig Iron.—Considerable new inquiry for steel making iron, both Bessemer and basic, is reported from the Pittsburgh district. The General Electric Company is in the market for about 10,000 tons of foundry and malleable iron for the last quarter delivery. Of this 2400 tons of foundry iron and 1200 tons of malleable iron are wanted for its Erie works and the remainder for its New York and Massachusetts plants. Locally the market is not active, but prices are very firm. For outside shipment $14 appears to be the minimum quotation for No. 2 foundry, but this price is still being shaded about 25c. a ton in the Valley. Southern iron is not active, but firm. We note a sale of two 300-ton lots, one to a Cleveland consumer and another in Pittsburgh at $11, Birmingham, for No. 2, which is the minimum price. Some producers are holding for $11.50. While local foundries are not filled up with orders as far ahead as they were a few months ago, they are well filled with work and the consumption apparently has not fallen off. The blast furnace of the Girard Iron Company, Girard, Ohio, will blow out shortly. For prompt shipment and for the last half we quote delivery Cleveland as follows:

Bessemer	$16.65
Basic	15.00
Northern No. 2 foundry	$14.50 to 14.90
Southern No. 2 foundry	15.35
Gray forge	14.25
Jackson County silvery, 8 per cent. silicon	18.55 to 19.05

Coke.—While the demand for foundry coke is not active, prices are very firm and two or three large producers are so well sold up that they have withdrawn from the market. Standard Connellsville foundry coke is quoted at $3 per net ton at oven for prompt shipment and contract, with some producers asking as high as $3.25. Wise County, Va., foundry coke is quoted at $3 to $3.25. Furnace coke is firm at $2.50.

Finished Iron and Steel.—The feeling in the steel trade is fairly optimistic in spite of an inactive market. While the demand is light, orders show no falling off as compared with the past few weeks. There is a fair volume of current orders ranging from carloads and less up to 100 tons for early shipment, but specifications are light and there is little inquiry for material for future delivery. Some of the agricultural implement makers have not yet placed contracts. The demand for structural material is light and very little work is being figured on. However, all the local fabricating plants engaged largely in building work have all the orders they need for the next few months. Bids have been taken for the new Lake Shore shops at Air Line Junction requiring 1200 tons of steel. There is a very good demand for steel bars for reinforced concrete work, but orders for other purposes are light. Some shading of $1 a ton is reported by some of the smaller plate mills, but the leading producers are adhering to regular prices. Sheet prices continue irregular. Black sheets are quoted as low as 2.15c. for No. 28. Galvanized sheets appear firmer than black. No. 28 galvanized are quoted at $3.20 to $3.25. Continued weakness in the rivet market is shown by a sale of boiler rivets at 1.90c. Pittsburgh or $2 a ton below nominal prices, and it is understood that quotations have been made as low as 1.85c. on boiler rivets. Structural rivets are quoted nominally at 1.90c. Bar iron is weak and in light demand. Local mills quote iron bars at 1.45c. Cleveland for delivery in this vicinity, but are not attempting to meet prices for shipment in other districts. The city of Cleveland will receive bids September 10 for 3500 tons of cast-iron pipe. At the same time proposals will be received for special castings and for wrought-iron pipe covering the requirements of the city water department for a year. Warehouse business continues light with prices unchanged at 2c. for steel bar and 2.10c. for plate and structural material.

Old Material.—The scrap market shows but very little life. Some sales in small lots, mostly carloads, are being made at current prices, but no large transactions are pending and consumers are not buying for future delivery. The market generally is weak but prices remain at about the recent level. Dealers expect an advance in busheling prices and are holding that grade for a firmer market. Quotations on busheling have been advanced 25c. a ton. Other quotations are unchanged. We quote f.o.b. Cleveland, as follows:

	Per Gross Ton.	
Old steel rails, rerolling	$13.00 to	$13.50
Old iron rails		14.00
Steel car axles	17.00 to	17.50
Heavy melting steel	11.00 to	11.25
Old carwheels	12.50 to	13.00
Relaying rails, 50 lb. and over	23.00 to	25.00
Agricultural malleable	10.00 to	10.50
Railroad malleable	11.00 to	11.50
Light bundled sheet scrap	8.00 to	8.50
Per Net Ton.		
Iron car axles	$20.00 to	$21.00
Cast borings	5.75 to	6.00
Iron and steel turnings and drillings	4.50 to	4.75
Steel axle turnings	7.00 to	7.50
No. 1 busheling	10.25 to	10.50
No. 1 railroad wrought	10.50 to	11.00
No. 1 cast	11.00 to	11.50
Stove plate	8.50 to	8.75
Bundled tin scrap	10.00 to	10.50

A. Rotter & Co., dealers in old material, have discontinued their yard, and will hereafter transact a direct shipment business at 658 Leader-News Building, Cleveland, Ohio.

Better Feeling in Germany

Steel Bar Prices Recovering—Strikes of Shipyard Workmen Called Off

BERLIN, August 13, 1913.

The situation of the iron market has undoubtedly improved. Of a tangible improvement there is, it is true, only a rise in bars to report, but the uneasiness characteristic of the last few months has plainly begun to make way for a more confident feeling. The Bucharest treaty has contributed to this feeling, although it will be a considerable period before orders from the Balkans follow it, the condition of the money market being such as to overcome for the time the natural results of the treaty, but peace naturally clears the air somewhat. The calling off of the strike of the shipyard workers at Hamburg, Kiel and Stettin was also a favorable factor. Such an early end of the strike, which had already made itself felt in the plate market, had not been expected.

A Rise in Bars but a Fall in Plates

The improvement in bars demonstrates the end of price reduction in that material, which beginning in April carried quotations down from 125 marks to 95 marks ($29.75 to $22.61). Optimists affect to believe that the improvement in bars means the end of price reductions in all departments. Bars rose three marks Monday, reaching 98 marks ($23.32) net, free Oberhausen. A number of works are quoting only net prices against the usual discounts, reaching as high as 1½ per cent., which were granted in the last few weeks. Prices of bars, however, still vary considerably, and middlemen are reported to be reducing their profits, so that bars to the trade are cheaper than ever.

The strikes of the German and English shipyard workers have materially reduced the demand for plates, and as a consequence heavy plates have dropped 1 mark, being quoted at 113 marks to 114 marks ($26.89 to $27.13), f.o.b. Essen, with 1½ per cent. off. The Hoesch Iron & Steel Works is reported selling at 111 marks ($26.42) net, f.o.b. Dortmund. At these low prices the business is fair and orders are being taken reaching well into the first half of 1914. Thin plates have been held for the most part at 126 marks ($29.99) and are quieter.

Activity in Rails

Encouraging reports of activity in rails are received. Orders for street rails have come in in such volume that there are specifications on hand reaching into 1915. The orders are fairly equally divided between domestic and foreign. Delivery periods have had to be extended in some instances.

The situation in structural shapes is unfavorable. Only large orders from abroad have kept the output up to the level of last year. As a result of tight conditions in the money market—we still have a Reichsbank discount rate of 6 per cent. and private discount at 5 and probably going higher—building activity in Germany is pretty well paralyzed. The outlook is not at all encouraging. The market for semi-finished products is normal, with a fair demand, but there is a disposition to wait for price reductions. Wire materials are unimproved. In other departments the market is fairly good, especially in war material.

Low Wire-Rod Prices Affect Dividends

The long-continued unfavorable conditions in the wire industry have, it is understood, made it necessary for the Langendreer Iron & Wire Works in Westphalia to declare a 3 per cent. dividend against 8 per cent. last year. The company's blast furnaces have worked at an excellent profit owing to the conditions in the pig-iron market, but the prices of wire rods have been so low and competition so sharp that the finishing mills operated on a very narrow margin. The outlook is considered unpromising.

The yearly report of the Association for the Protection of the Economic Interests of the Iron and Steel Industry of Alsace-Lorraine and Luxemburg characterizes the last fiscal year as satisfactory. The district increased its pig-iron production from 4,640,000 tons to 5,720,000 tons, an increase of 23.06 per cent., whereas the increase for the whole German Empire was but 14.07 per cent. Despite an unfavorable market since early in April the works of the district are still running full and prices, at least for the syndicated articles, have thus far been held up well. Specifications, however, are beginning to come in slowly. Excellent business for the moment in railroad material makes up for the lack of other work.

The Steel Works Union's shipments for July aggregated 505,697 tons, which compares with 605,570 tons in June and 541,614 tons in July, 1912. Of the total for July, 107,586 tons was semi-finished steel, 242,204 tons railroad material, and 155,709 tons structural shapes.

St. Louis

ST. LOUIS, MO., August 25, 1913.

Transactions have been somewhat less in volume, but have been more generally spread, indicating a need of material and an activity of consumption that presages larger buying. Disposition to contract ahead is still lacking, but prices are well held, deliveries are being insisted upon and consumers unquestionably utilizing supplies freely.

Pig Iron.—Demand has been altogether in small lots, none running beyond 500 tons and all for no later delivery than last quarter, there being a disposition on the part of both consumer and furnace to avoid consideration of deliveries into next year particularly in Southern iron, though a considerable amount of the recent sales of Northern iron has been for 1914 delivery. The aggregate of the small transactions has run into quite satisfactory figures, all things considered, and these have been pretty widely spread, showing that the consumers are not loaded up with material to any extent and that they are buying for practically immediate needs. No. 2 Southern is very firmly held in this market at $11, Birmingham basis, and representatives insist that none can be had below that figure, while in some cases slightly more is obtained under special conditions, analyses, etc. Chicago No. 2 X is quoted at $15 and Ohio iron at $14, Ironton basis. Sales have ranged from carload lots up to 500 tons, but none above that figure. Inquiries were closed almost as quickly as they appeared and there is very little trading over price. About the only inquiry of any importance remaining unfilled this writing is one for 600 tons of Northern coke iron, for 1913 delivery.

Coke.—A considerable number of small transactions marked the week, but none of large quantities. By-product coke is being quoted on the Connellsville basis.

Finished Iron and Steel.—The largest items coming out for consideration were the Twelfth street viaduct at Kansas City requiring about 1800 tons of reinforcing bars and 200 tons of structural iron and a hotel in St. Louis involving 500 to 600 tons of reinforcing bars. In structural material new business has shown no increase, but has kept up well, and the fabricating shops report two or three months work ahead with further work in sight which promises to keep them busy for a considerable additional period. Bars, reinforcing and ordinary, have been in only fair demand as to new business, but shipments under contracts are as insistent as ever. The agricultural and wagon trade, while not slacking up on their contract takings, are somewhat apprehensive for the moment at least over some of the crop reports and are inclined toward conservatism.

Old Material.—Scrap continues in better demand, though not so sharply so as a week ago. There is a continuance of the improved feeling and optimistic views are more prevalent. The steel mills are making some inquiry now as well as the foundries and rolling mills, and while there is not absolute freedom from embargo as yet, there is a distinctly better attitude on the part of the consuming industries at this point. Steel rails of relaying quality are still in sharp demand and difficult to get, though an offering by the St. Joseph & Grand Island of 800 tons this week promises some relief to the situation. Other scrap offerings include 700 tons of miscellaneous material from a Kansas City industry and about 3000 tons from the Burlington system. We quote dealers' prices, f.o.b. St. Louis as follows:

Per Gross Ton.

Old iron rails	$12.00 to $12.50
Old steel rails, rerolling	11.50 to 12.00
Old steel rails, less than 3 feet	10.25 to 10.75
Relaying rails, standard section, subject to inspection	23.50 to 24.50
Old carwheels	11.00 to 11.50
Heavy melting steel scrap	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Frogs, switches and guards cut apart	10.00 to 10.50

Per Net Ton.

Iron fish plates	$11.00 to $11.50
Iron car axles	18.50 to 19.00
Steel car axles	14.75 to 15.25
Wrought arch bars and transoms	13.00 to 13.50
No. 1 railroad wrought	10.00 to 10.50
No. 2 railroad wrought	9.25 to 9.75
Railroad springs	8.50 to 9.00
Steel couplers and knuckles	8.50 to 9.00
Locomotive tires, smooth	10.25 to 10.75
No. 1 dealers' forge	7.00 to 7.50
Mixed borings	4.00 to 4.50
No. 1 busheling	8.50 to 9.00
No. 1 boilers, cut to sheets and rings	5.50 to 6.00
No. 1 cast scrap	9.00 to 9.50
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	7.75 to 9.25
Agricultural malleable	6.75 to 7.25
Pipes and flues	6.75 to 7.25
Railroad sheet and tank scrap	5.00 to 5.50
Railroad grate bars	6.75 to 7.25
Machine shop turnings	5.25 to 5.75
Bundled sheet scrap	4.75 to 5.25

British Markets Are Quiet

American Inquiries for Semi-Finished Steel Are Not Taken Seriously

(By Cable)

LONDON, ENGLAND, August 27, 1913.

The general demand is quiet, and the market is therefore featureless, awaiting a fresh lead. America is still inquiring for semi-finished steel, but this is not regarded as serious. Stocks of pig iron in Connal's stores are now 188,983 gross tons, against 187,298 tons a week ago. We quote as follows:

Cleveland pig-iron warrants (Tuesday), 54s. 6d. ($13.26), against 54s. 10d. ($13.34) a week ago.

No. 3 Cleveland pig iron, makers' price f.o.b. Middlesbrough, 55s. 3d. ($13.46), against 56s. ($13.64) a week ago.

Ferromanganese, £10 11s. 9d. ($51.53), f.o.b. shipping port.

Steel sheet bars (Welsh), delivered at works in Swansea Valley, £4 15s. ($23.11).

German sheet bars, f.o.b. Antwerp, 87s. 6d. ($21.29).

German 2-in. billets, f.o.b. Antwerp, 80s. ($19.46).

German basic steel bars, f.o.b. Antwerp, £4 16s. to £4 17s. ($23.36 to $23.60), an advance of 1s. (24c.).

Steel bars, export, f.o.b. Clyde, £6 12s. 6d. ($32.24).

Steel joists, 15-in., export f.o.b. Hull or Grimsby, £6 5s. ($30.42).

German joists, f.o.b. Antwerp, £5 8s. to £5 11s. ($26.28 to $27.01).

Steel ship plates, Scotch, delivered local yards, £7 15s. ($37.72).

Steel black sheets, No. 28, export f.o.b. Liverpool, £9 5s. ($45.02).

Steel rails, export f.o.b. works port, £6 12s. 6d. ($32.24).

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 13s. 1½d. ($3.19).

Buffalo

BUFFALO, N. Y., August 26, 1913.

Pig Iron.—Inquiry continues to be in fair volume and quite general in character. The volume being booked is not at so high a rate as for the preceding two weeks, sales of all grades for the current week aggregating about 15,000 tons. The whole tenor of the situation, however, is most encouraging and some furnace interests are rapidly disposing of such iron as they will produce in the remainder of the year. A prominent feature is the urgency with which many consumers of most grades are calling for shipment, indicating that foundry melts are keeping up to a good average and that stocks on foundry yards are being depleted. Prices are being firmly held and show a slightly advancing tendency. We quote as follows, f.o.b. Buffalo, for delivery over remainder of the year:

No. 1 foundry	$14.25 to $14.50
No. 2 X foundry	14.00 to 14.25
No. 2 plain	14.00
No. 3 foundry	13.75 to 14.00
Gray forge	13.75
Malleable	14.00 to 14.50
Basic	14.25 to 14.50
Charcoal (regular brands)	15.75 to 16.75
Charcoal, special brands and analysis	17.00 to 20.00

Old Material.—The scrap metal market has shown a slight improvement—with better demand in a number of lines from mills and foundries. The principal activity is in borings and turnings. The increased demand has tended to stiffen prices, although not sufficiently to change last week's price schedule. Dealers express confidence that a somewhat higher range will become effective in a very short time. We quote as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel	$11.00 to $11.50
Boiler plate, sheared	12.50 to 13.25
Bundled sheet scrap	8.00 to 8.50
No. 1 busheling scrap	10.50 to 11.00
No. 2 busheling scrap	8.00 to 8.50
Low phosphorus steel scrap	16.50 to 17.00
Iron rails	15.00 to 15.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 railroad and machinery cast scrap	13.00 to 13.50
Steel axles	17.00 to 17.50
Iron axles	22.50 to 23.00
Carwheels	13.00 to 13.50
Railroad malleable	12.00 to 12.50
Locomotive grate bars	10.00 to 10.50
Stove plate (net ton)	9.75 to 10.00
Wrought pipe	9.50 to 10.00
Machine turnings	6.00 to 6.50
Heavy steel axle turnings	8.00 to 8.75
Clean cast borings	6.25 to 6.75
Bundled tin scrap	14.00

Finished Iron and Steel.—Inquiries have been more numerous and cover larger amounts in many branches of the trade than for some time. Agricultural implement makers are coming into the market more fully and specifications for pipe have been good. A better feeling is reported among sellers, brought about by the evidences of additional requirements in bars, plates and sheets to cover regular operations of manufacturers. Considerable business is reported for the week in billets and semi-finished products. In fabricated structural lines a good volume of orders is coming in, comprised largely of small jobs. Most fabricators have plenty of work on hand for at least three months. Bids are soon to be received for about 1000 tons of structural steel for the new Canadian plant of the Union Carbide Company, Niagara Falls, N. Y., to be built at Welland, Ont., comprising six buildings. Detailed plans for the new Lackawanna Railroad passenger station and elevated terminal at the foot of Main street, Buffalo, have been practically agreed upon by the Buffalo Terminal Commission and the officials of the Lackawanna Railroad, and it is expected that construction work calling for about 5000 tons of steel will soon be ready for contract.

New York

NEW YORK, August 27, 1913.

Pig Iron.—In this immediate district the week's business in pig iron has been of only fair proportions. The largest inquiry that has been before the trade, and on which little has been closed so far as can be learned, is that of an electric machinery company calling for over 8000 tons of foundry iron for delivery at New York State and Massachusetts plants in the remainder of the year. A few hundred tons of malleable iron have been bought by this interest. Two New Jersey foundries are in the market, one, a manufacturer of plumbers' supplies, asking for 1500 tons for delivery through the year. The other asks for 250 tons for the last quarter and a like amount for the first quarter. Very little business for 1914 has been put through. Buffalo furnaces as a rule are getting $14 at furnace for No. 2 X foundry and canal freight is reckoned at $1.40, with an additional charge of 15 cents for loading into boat. Some iron for Brooklyn delivery has been sold at $15.75 alongside dock, and a few Jersey City sales have been made on a similar basis. On a Bridgeport inquiry for 2000 tons about 1500 tons was closed, most of the iron going to the Lebanon Valley. The delivered price is understood to have been somewhat under $16 for No. 2 iron. Buffalo furnaces are as a rule quite well sold through October, and in some instances to the end of November. Eastern Pennsylvania furnaces have shown somewhat more anxiety for business, recent sales of basic in that territory being made at the $15 level, which was possible in July. A few foundries, but only a few, are interested in the contract for cast-iron segments for a concrete-lined sewer on which bids are being taken this week by the Borough of Queens. About 10,000 tons of such castings will be required. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $15.75 to $16; No. 2 X, $15.50 to $15.75; No. 2 plain, $15.25 to $15.50. Southern iron is quoted at $15.50 to $16 for No. 1 foundry and $15 to $15.50 for No. 2.

Structural Material.—Evidences are not wanting of efforts to withstand the price weakness exhibited by some Eastern steel mills, and the larger mills are holding firmly at 1.45c. base, Pittsburgh, expressing, in fact, a belief that the early future will see the present weakness vanish owing to renewed demand. It remains that new projects of size are still scarce, and while there is a fair run of lettings, they are individually for relatively small amounts. The week has, however, witnessed the closure of over 22,000 tons in this territory, in fair size jobs, but a large part has been discounted for some time as business surely to be counted on by the mills, namely for New York subway work. On the basis of last week's tenders 9700 tons for the subways will be furnished by the Pennsylvania Steel Company, and on the tenders of two weeks ago 3500 tons will be supplied by the American Bridge Company. Other lettings include 2500 tons for the Maine Central at Augusta, given to the Phoenix Iron Company; 2000 tons for shops at Bloomington, Ill., for the Chicago & Alton, given to the American Bridge Company; 500 tons for a trestle at Dunmore, Pa., to the York Bridge Company; 650 tons and 950 tons for two apartment houses on Park avenue, New York, one at Eighty-sixth street and the other at Fifty-fifth street, both given to Hay Foundry & Iron Works; 260 tons for a garage in the Bronx to the Radley Steel Construction Company; 400 tons for an apartment house, West Eighty-first street, to the Hinkle Iron Company; 300 tons for the Loomis Institute at Windsor, Conn., to the American Bridge Company; 250 tons for signal bridges for the Pennsylvania Railroad to the Belmont Iron Company, and 500 tons for a high school at Hartford, Conn., to the Phoenix Iron Company. Worth Brothers Company has closed for 250 tons for a building at Coatesville, Pa. A round tonnage will be required for catenary construction for the electrification of the Norfolk & Western, of which mention has been made in these columns. The Boston City Club, 1500 tons, is reported closed and also 800 tons for the extension of a theater in New York. We quote mill shipments of plain material at 1.45c., Pittsburgh, or 1.61c., New York, though these prices are shaded by some mills on attractive offerings. Prices from store are 2.10c. to 2.15c.

Plates.—Buyers are finding quite a little resistance

in securing less than 1.45c., base, Pittsburgh, and most mills, both of eastern and western Pennsylvania, are holding firmly even on tempting promises of heavy specifications for the rest of the year at 1.40c. New demand is, however, very scarce and there is little life in the car buying field, about the only live business being 204 passenger cars for the New York Central, the 28 passenger cars for the Boston & Albany, the 170 passenger cars for the New Haven and 500 box and 500 coal cars for the Boston & Maine. We quote plates at 1.56c. to 1.66c., New York, depending on the size of the order and the urgency for shipment, and, in the case of the lowest quotation, on the mill.

Bars.—One of the interesting developments in the steel bar business is an occasional waiving of the charge for twisting reinforced bars, which have been in better demand. Reinforcing bars generally are obtainable promptly, particularly where they are of the deformed type and not twisted. The market as regards new business is generally lifeless, although one company reports new business for August as 80 per cent. greater than for the same period in July. No change is noted in bar iron, but it is an interesting fact that at a recent gathering of bolt and nut interests no one complained of any shading in these commodities. We quote mill shipments for steel bars at 1.66c., New York, and shipments from store at 2c. to 2.05c. and bar iron, mill shipments, at 1.40c. to 1.45c., New York, and from store 2.05c. to 2.10c.

Ferroalloys.—With inquiries out for between 300 and 400 tons of spot shipment 80 per cent. ferromanganese, the makers' price is unchanged at $56, Baltimore. It is admitted that material can be had at a lower figure, perhaps as low as $55 if sufficient shopping is done, but less is now heard of shading. The market for 50 per cent. ferrosilicon is quiet at $75, Pittsburgh, for carloads, $74 for 100 tons and $73 for 600 tons and over.

Cast-Iron Pipe.—Bids on 5650 tons of 6 to 30-in. pipe were opened by the sewer and water division of the public works department of Boston, Mass., on Monday, August 25. It is now stated that bids will be asked in September on the great contract for 36-in. flexible pipe for the extension of the Catskill water supply to Staten Island. This will take a heavy tonnage. Public lettings are few and seldom for any considerable quantity, but the trade believes that the drought conditions this year will impel many municipalities to extend their sources of supply for another season, causing an increased consumption of pipe. At present financial conditions have interfered with the placing of bonds for such purposes. The private demand is sporadic, intervals of some activity being succeeded by profound dullness. Prices of carload lots of 6 in. are $23 to $24, per net ton, tidewater, New York.

Old Material.—Steel works are as yet doing little in the purchase of scrap in this market, but rolling mills have been showing more interest, although so far their purchases have been confined to small lots. A little better movement is thus reported in various classes of wrought scrap and in cast borings. The foundries are irregular buyers, taking occasional small lots. The better feeling of the past fortnight continues, and dealers generally express themselves hopefully with regard to the future. Dealers' quotations are as follows, per gross ton, New York:

Old girder and T rails for melting	$9.00 to	$9.50
Heavy melting steel scrap	9.00 to	9.50
Relaying rails	21.50 to	22.00
Rerolling rails	12.50 to	13.00
Iron car axles	21.00 to	21.50
Steel car axles	14.50 to	15.00
No. 1 railroad wrought	11.75 to	12.25
Wrought-iron track scrap	11.00 to	11.50
No. 1 yard wrought, long	10.50 to	11.00
No. 1 yard wrought, short	10.00 to	10.50
Light iron	4.50 to	5.00
Cast borings	5.25 to	5.75
Wrought turnings	4.50 to	5.00
Wrought pipe	8.75 to	9.25
Carwheels	12.50 to	13.00
No. 1 heavy cast, broken up	10.75 to	11.25
Stove plate	8.00 to	8.50
Locomotive grate bars	7.50 to	8.00
Malleable cast	9.00 to	9.50

England and Germany are devoting a good deal of attention to the use of benzol instead of petrol or gasoline in motor vehicle engines. A number of iron and steel companies are installing benzol recovery plants in connection with their coke ovens. The Prussian Ministry of War has recently issued rules and regulations for an international competition of carburetors for benzol in December, in which prizes will be awarded.

Metal Market

NEW YORK, August 27, 1913.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
Aug.	Lake.	Electrolytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
21	16.00	15.75	41.30	4.75	4.67½	5.85	5.70
22	16.00	15.62½	41.15	4.75	4.67½	5.85	5.70
23	16.00	15.62½	.....	4.75	4.67½	5.85	5.70
25	16.00	15.62½	41.30	4.75	4.67½	5.85	5.70
26	16.00	15.62½	41.95	4.75	4.67½	5.90	5.75
27	16.00	15.62½	42.60	4.75	4.67½	5.90	5.75

Copper is dull, with some weakness shown. Fair buying of tin yesterday brought about higher prices. Lead is strong, although activity is not great. Spelter prices have advanced despite light buying. Antimony is unchanged.

New York

Copper.—Practically no business developed in the past week. The strike situation in the Lake district is clearing up very slowly with the aid of other than regular employees. The quotation for Lake at 16c. is entirely nominal. The lack of demand for electrolytic brought out some resale copper which was offered at 15.62½c., cash New York, but there is no indication that any of these lots were taken, and some reports have it that they were withdrawn. The fact is that present requirements of consumers are sufficiently supplied. While the demand for copper is almost nil that for sheet copper and brass goods is reported as good. Quotations for spot copper in London to-day are £70 2s. 6d. and for futures, £70 1s. 3d. Exports this month total 29,342 tons.

Pig Tin.—This metal was dull until yesterday when between 200 and 250 tons changed hands. This activity was called fair when contrasted with the extreme dullness of the preceding few days. The sensitiveness of the market was indicated from the fact that comparatively small buying sent prices up to the extent it did both here and abroad. Yesterday tin was quoted at 41.95c., an advance of 60 points over the preceding day, while to-day it is quoted at 42.60c. The main feature at present is that supplies are light and that arrivals are at once shipped to consumers. These deliveries against old contracts explain the absence of buying. It is pointed out that if there were short interests under the present conditions a squeeze would be certain to result. London quotations to-day are £193 for spot and £192 5s. for futures. The arrivals this month total 3424 tons and there is afloat 1655 tons.

Lead.—Strength is given to the market by the continuance of the strike at the lead mines and the poor outlook now existing for a speedy settlement. Prices are higher so far as the independent interests are concerned, although sales have fallen off and are not all that conditions would seem to warrant. The bone of contention which promises the most trouble is recognition of the miners' union. On the question of higher wages alone some agreement would probably be reached without much further trouble. The American Smelting & Refining Company continues to quote 4.75c., New York, and 4.67½c., St. Louis. Independents, however, have made sales at considerably higher prices. Thursday last, for instance, sales were made at 4.80c., East St. Louis. On Saturday the price dropped to 4.70c., St. Louis, on the strength of the belief that the question of recognition would be waived. On Monday sales were made at 4.80c., New York, and more metal than was available could have been disposed of at that figure. Unless conditions change it is predicted the price will go to 5c.

Old Metals.—The market is firm. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	15.00 to 15.50
Copper, heavy and wire	14.50 to 15.00
Copper, light and bottoms	13.50 to 13.75
Brass, heavy	9.75 to 10.00
Brass, light	8.25 to 8.50
Heavy machine composition	13.25 to 13.50
Clean brass turnings	8.75 to 9.00
Composition turnings	12.00 to 12.50
Lead, heavy	4.50
Lead, tea	4.25
Zinc scrap	4.50

Spelter.—Despite the fact that there has not been any steady activity worthy of note quotations have advanced and 5.90c. to 5.95c., New York, and 5.75c. to 5.80c., St. Louis, are quoted. Yesterday 100 tons of prompt delivery metal was sold at 5.85c., New York, but surrounding the sale were some exceptional circumstances. The market abroad shows correspondingly greater strength, but there, also, influences other

han active buying appear to be the cause of the higher uotations.

Antimony.—The market is without change at 7.75c. o 8c. for Hallett's, 8.35c. to 8.40c. for Cookson's and 8.37½c. to 7.50c. for Chinese and Hungarian grades. No business of large volume has developed, and so far s futures are concerned the large amount of metal in end is still the important factor.

Chicago

August 25.—There is still a strong demand for copper in this market and prices are firm. Considerable tonnages of both lead and tin have also been closed. The market on old metals is quiet without change. We quote as follows: Casting copper, 16c.; Lake, 16.25c. in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 42c.; small lots, 44c.; lead, desilverized, 4.70c. to 4.75c.; corroding, 4.95c. to 5c., for 10-ton lots; in carloads 2½c. per 100 lb. higher; spelter, 5.85c.; Cookson's antimony, 10.50c. and other grades 7.75c. in small lots; sheet zinc, $7.75, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carlods of 600-lb. casks. Old metals are quiet, with a slightly higher market on copper. We quote buying prices for less than carload lots: Copper wire, crucible shapes, 13c.; copper bottoms, 12c.; copper clips, 12.75c.; red brass, 12c.; yellow brass, 8.50c.; lead pipe, 3.75c.; zinc, 4c.; pewter, No. 1, 26c.; tinfoil, 31c.; block tin pipe, 36c.

St. Louis

August 25.—The metal market has been quite active. Lead and spelter sagged off at the beginning of last week, but strengthened up again and remained firm at top prices. Lead closed to-day at 4.75c. to 4.85c.; spelter, 5.75c. to 5.85c.; tin, 41.50c. to 41.85c.; Lake copper, 16.35c.; electrolytic copper, 16.15c. to 16.25c.; Cookson's antimony, 8.75c. to 8.85c. The Joplin ore market closed the week sharply higher. Lead made the largest gain and galena sold at $58 per ton, which is $3 advance. The range on zinc blende was $47 to $49.50 for 60 per cent., while the settlement for the choicest ores ran to $51.50. Calmine brought $22 to $24 for 40 per cent., while the choicer lots sold as high as $29. In general the trend of prices was sharply up, even on the lowest grade ores, and the buying was very actice. We quote miscellaneous scrap metals as follows: Light brass, 6c.; heavy brass and light copper, 10.50c.; heavy copper and copper wire, 11c.; zinc, 2.75c.; lead, 3c.; tinfoil, 30c.; pewter, 21c.; tea lead, 2.75c.

Iron and Industrial Stocks

New York, August 27, 1913.

The stock market has not been particularly active in the past week, some days showing decided dullness while in numerous stocks no transactions occurred. The Mexican situation is the special restraining influence. Prices have been well maintained, however, and some stocks have shown good advances. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can, com.....	32¾- 35⅛	Lackawanna Steel	38
Am. Can, pref.....	93⅜- 97	Nat. En. & St., pref.....	82⅛
Am. Car & Fdy., com.	45 - 46½	Pressed Steel, com..	24½- 24¾
Am. Car & Fdy., pref.	114¼-115	Railway Spring, com.	25¼- 25⅞
Am. Loco., com....	32 - 35⅝	Republic, com.....	23½- 24⅜
Am. Loco., pref....	101½-102	Republic, pref.....	88⅛- 89
Am. Steel Foundries.....	31⅞	Rumely Co., com..	17 - 17⅛
Bald. Loco., com....	44 - 45½	Rumely Co., pref...	41 - 44
Bald. Loco., pref...	105 -105⅛	Sloss, com.	29¼- 31
Beth. Steel, com....	34 - 35	U. S. Steel, com...	61¾- 64⅛
Beth. Steel, pref...	72 - 73¼	U. S. Steel pref....	107⅝-108¼
Case (J. I.), pref...	96 - 99	Va. I. C. & Coke.....	39½
Colorado Fuel	31 - 31¾	Westinghouse Elec..	70 - 72½
Deere & Co., pref..	95½- 95⅞	Chic. Pneu. Tool...	51 - 51½
General Electric ...	144 -146	Cambria Steel.....	46 - 46½
Gt. N. Ore Cert...	34½- 35¾	Lake Sup. Corp....	26 - 26⅛
Int. Harv., com.....	107½	Warwick	10 - 10⅛
Int. Harv. Corp....	107 -107½	Crucible Steel, com.	15¼- 15¾
Int. Harv., Corp., pref....	112	Crucible Steel, pref.	92½- 93

Dividends Declared

The Harbison-Walker Refractories Company, regular quarterly, ½ of 1 per cent. on the common stock, payable September 1.

The New York Air Brake Company, regular quarterly, 1½ per cent., payable September 18.

The Fownes interests of Pittsburgh, who will build a seamless tube mill near Economy, Pa., have applied for a charter under the name of the Standard Seamless Tube Company, which will be granted in a short time. Plans for the mills are now being prepared, and the company will be ready soon to ask bids on the buildings and equipment.

New Tools and Appliances

This is essentially a news department for which information is invited

Cutting-Off Machine.—A drop-arm type of cutting-off machine has been added to the line built by Houghton & Richards, 1394 West Third street, Cleveland, Ohio. This machine was designed to occupy the same place in the cutting of metal that is filled by the ordinary band saw in the woodworking industries. The feed mechanism, which is of the gravity type, is operated by the weight of the drop arm, but a drum friction equipped with a band brake regulates this action. The depth of cut is regulated by adjusting a cam on the upper driving shaft, which engages a steel roller on the shifting lever and shifts the belt to the loose pulleys. A small arm attached to the shifter rod operates a vertical shaft passing through the curved pedestal, and is also connected with a horizontal shaft below the table of the machine which governs a lifting device. When the lifting device is down the handwheel must be turned to release the ratchet and start the machine. As soon as the saw has cut through the piece upon which it is working, the arm is locked, thus making it impossible to start the machine until the lock of the arm has been released. The size of saw used is 0.031 in. in thickness and ⅝ in. wide, the thin blade affecting a material saving in the cutting of expensive material. The machines are built for either belt or motor drive, and can be supplied in three sizes for cutting 6, 8 and 12 in. square or round stock.

Disk Wheel Cementing Press.—For use in cementing the disk wheels for its bench type grinding machine, the Bickford Machine Company, Greenfield, Mass., has brought out a press. The construction is simple, the pressure being applied by turning a handwheel on top of the frame. A screw ⅞ in. in diameter is attached to the handwheel, and at the lower end there is a disk 10½ in. in diameter, which rests upon the wheel. For resisting the thrust a ball bearing is provided between the collar on the screw and a shoulder on the disk hub. Sufficient movement of the screw is provided to enable two disks to be taken in at once, if necessary.

Dividing Chuck.—Lathe work is the special field covered by a new dividing chuck that has recently been placed on the market by the Wennerstrom Bros., 432 St. Clair avenue, Grand Rapids, Mich. In addition to lathe work, however, the chuck can also be used on the milling machine, as a substitute for the regular dividing head as a much greater range is covered by the chuck, and, if desired, a base to provide for angular settings can be furnished, which gaves a practically unlimited field for the device. It is possible to turn out work having various arrangements of circular and other shaped holes, so that the chuck is well adapted for toolroom work, and especially for the production of punches and dies. The clearance in the latter can be obtained by setting the compound rest over to the desired angle. Three sizes of chuck, capable of handling a large range of work, are made.

A 20-In. Drilling Machine.—The Canedy-Otto Mfg. Co., Chicago Heights, Ill., has developed a 20-in. drilling machine in which the spindle quill is placed in the upper bracket. This arrangement enables a pilot wheel with long handles to be used, and the feed is either by hand or power. The diameter of the spindle is 1¾ in.

Electrolytic Method of Preventing Corrosion.—The Bureau of Mines, Washington, D. C., has published a pamphlet entitled "An Electrolytic Method of Preventing Corrosion of Iron and Steel," giving a preliminary report by J. K. Clement and L. V. Walker on the results of experiments for the purpose of developing such a method, undertaken at the Pittsburgh experiment station of the Bureau, beginning in May, 1911, and continuing for a number of months. The report states that the results appear to justify the hope that the method it outlines may be applied successfully in mines for protecting iron and steel against the corrosive action of acid underground waters as well as for protecting structures and machinery that are exposed to the acid waters of streams. Copies of the pamphlet can be had on application to the director of the bureau.

June Iron and Steel Exports and Imports

The June report of the Bureau of Foreign and Domestic Commerce shows the iron and steel exports for June to have been somewhat less in value than those for the previous month. The total value of the exports of iron and steel and manufactures thereof, not including iron ore, in June was $25,228,346, against $26,718,970 in May. The exports of commodities for which quantities are given totaled 243,188 gross tons in June, against 242,192 tons in May. Import values for June, $3,291,875, did not differ greatly from those of May, which were $3,181,597.

Details of the exports of tonnage commodities for June and for the fiscal year ended with June, compared with the corresponding periods of the previous year, are as follows:

Exports of Iron and Steel

	June		Twelve months	
Commodities	1913 Gross tons	1912 Gross tons	1913 Gross tons	1912 Gross tons
Pig iron	22,784	27,152	287,022	185,985
Scrap	4,995	13,153	102,201	88,161
Bar iron	814	1,344	22,958	15,646
Wire rods	5,293	4,996	74,823	47,935
Steel bars	16,288	14,870	231,129	146,045
Billets, ingots, blooms, n.e.s.	7,322	23,800	230,728	234,381
*Bolts and nuts	2,177	.....	21,633	.....
Hoops and bands	1,167	801	18,313	8,238
*Horse shoes	88	.....	1,158	.....
Cut nails	175	2,246	4,805	12,353
§Railroad spikes	1,644	.....	13,382	.....
Wire nails	3,824	5,044	54,526	62,916
All other nails, including tacks	229	1,036	4,209	12,572
Pipes and pipe fittings	28,194	20,928	282,230	231,670
Radiators and cast iron house heating boilers	780	418	8,615	4,213
Steel rails	44,574	48,321	453,145	417,547
§Galvanized-iron sheets and plates	6,366	19,444	114,650	186,396
§All other iron sheets and plates	2,158		32,026	
§Steel plates	21,826	28,378	263,313	278,921
§Steel sheets	11,178		132,924	
Structural iron and steel	37,753	32,001	366,654	251,535
Tin and terne plates	5,576	9,228	73,376	81,205
Barbed wire	6,108	7,925	87,527	103,101
All other wire	11,875	12,102	137,795	140,977
Totals	243,188	273,187	3,019,142	2,509,797

*Included in "all other manufactures of iron and steel" prior to July 1, 1912.
§Not separately stated prior to July 1, 1912.

In June the imports of commodities for which quantities are given totaled 36,597 tons, against 28,572 tons for May. The increase in import tonnage is accounted for, in the most part, by the increase in tin and terne plates, from 2862 gross tons in May to 7726 tons in June. Details of the imports of commodities for which quantities are given for June and for the fiscal year ended with June, compared with the corresponding periods of the previous fiscal year, are as follows:

Imports of Iron and Steel

	June		Twelve months	
Commodities	1913 Gross tons	1912 Gross tons	1913 Gross tons	1912 Gross tons
Pig iron	13,506	14,354	155,169	115,321
Scrap	5,669	1,170	46,163	14,238
Bar iron	2,840	2,682	30,168	23,672
Structural iron and steel	1,745	62	8,005	2,863
Billets, bars and steel plates, n.e.s.	2,110	1,423	20,869	22,485
Steel rails	597	308	5,024	3,297
Sheets and plates	167	208	3,724	2,522
Tin and terne plates	7,726	158	12,654	2,952
Wire rods	2,237	1,042	17,143	13,927
Totals	36,597	21,407	293,919	201,277

The imports of iron ore in June were 241,069 gross tons, against 191,860 tons in May, 1913, and 180,112 tons in June, 1912. Of the June imports of iron ore 162,830 tons came from Cuba, 31,120 tons from Newfoundland and Labrador, 26,097 tons from Canada, 7839 tons from Sweden, 5983 tons from Spain, and 17,754 tons from other countries.

The total value of the exports of iron and steel and manufactures thereof, not including iron ore, for the fiscal year ended with June was $304,605,797, an amount considerably above that of the fiscal year ended with June, 1912, which was $259,709,399. The fiscal year 1912 had given the highest record up to that time. The total value of the imports of iron and steel and manufactures thereof, exclusive of ore, for the fiscal year ended with June, was $33,636,358, against $26,551,040 for the previous fiscal year and $34,205,968 for the fiscal year ended June, 1911.

American Locomotive Company's Annual Report

The Best Year in Its History—Will Discontinue the Building of Automobiles

In the fiscal year ended June 30, 1913, the American Locomotive Company earned gross $54,868,175, the largest gross earnings reported in the history of the company. The balance available for dividends, $6,185,305, only has been exceeded once. The amount of unfilled orders on the books July 1 was $17,156,388, which compares with $14,450,000 on July 1, last year. After paying the preferred dividends and setting aside $600,000 for additions and betterments, there was a surplus of $3,835,305, which compares with $117,554 for the preceding year when no appropriation for additions and betterments was made. Gross earnings in the year ended June 30, 1912, were $30,449,451, and $1,867,554 was available for dividends.

Included in the expenses for the past year was an allowance of $1,226,535 for depreciation, against a similar allowance of $1,021,382 the preceding year.

W. H. Marshall, president of the company, in his address to the stockholders, says:

"New orders were well sustained up to June, when there was a marked falling off, and there is now every indication of a reduction in operations of plants in the United States in the near future.

"With a view to keeping pace with the constantly growing market in Canada, which for some time has been more than the Montreal plant could meet, there was authorized $550,000 for extensions to that plant which, when completed about January, 1914, will increase its capacity to 35 engines per month, or about 40 per cent.

"The directors at a meeting August 13, 1913, resolved to discontinue the manufacture of automobiles and motor trucks. The automobile department, since its start in 1905, has been unprofitable, and the prospect for carrying on the business successfully is so uncertain as not to warrant, in the judgment of the directors, a continuance in this field of industry. Out of the accumulated surplus, as shown in the balance sheet, a reserve of $2,300,000 has been created to meet any losses that may occur in the liquidation of this business.

"The company takes this opportunity to assure owners of Alco vehicles that arrangements will be made to furnish them repair parts for not less than five years to come and, further, that it will fulfill in every respect its obligations given under guarantee to its customers."

Automobile authorities declare that the company's automobile factory at Providence, R. I., where $6,000,000 is invested, was operated at a loss of $600,000 last year. They further assert that the Alco department has always been operated at a loss owing to the remote location of its plant, the cost of getting raw material to Providence, and the delay in making deliveries. In the past year 85 per cent. of the company's automobile business was in trucks. Its factory at Providence is one of the most completely equipped in the country. A director of the American Locomotive Company is quoted as saying that, while the company has decided to withdraw from the manufacture of motor cars, the disposition of the factory at Providence has not been decided upon.

About 200 union structural steel workers at Buffalo have struck, with a demand for an increase in wages to 65c. per hr. from 60c., the present scale. The strike ties up work on a large number of buildings and affects most of the fabricators and erectors of the city, with the exception of work under way by the leading interest, which is operating open shop. The Steel Constructors' Association, embracing every fabricating and erecting company in the city, with the exception of one small concern, proposes to hold firm in its resistance to the demands of the strikers and is advertising for men to work open shop. The Lackawanna Bridge Company has already begun operations on the open-shop plan on a number of jobs it has under way.

Pig-Iron Output After Two Panics

The Parallel Between the Period Following 1893 and That Following 1907

In *The Iron Age* of April 6, 1911, a chart was reproduced which had been prepared by Noah H. Swayne, 2d, resident manager of Rogers, Brown & Co., Philadelphia, making a comparison of the production of pig iron in the years 1893 to 1899 and 1907 to 1911. The purpose was to show an approximate parallelism between the course of the pig-iron industry in the periods following the two panics.

In the accompanying chart are reproduced the curves plotted by Mr. Swayne, but they have been extended to 1902 in the case of the one representing the panic of 1893, while the curve for the 1907 panic period and later years has been brought down to August, 1913. The diagram is based on *The Iron Age's* figures showing the daily rate of production of coke and anthracite iron month by month.

While the panic of 1893 began about five months earlier in the calendar year than that of 1907, the dips and peaks in the upper curve (panic of 1907) follow with a certain regularity those in the lower one. It will be seen that the abrupt descent after October, 1907, in the upper curve is steeper and deeper than that following the May panic of 1893. A noticeable parallelism is in the marked increase in production in the second half of 1909, a period which by many writers was compared with the second half of 1895. The descent in the first half of 1910 compares with that in the first half of 1896. Another parallel is in the two dips, with corresponding re-ascents, that mark 1910 and 1911 in the upper curve and 1896 and 1897 in the lower one. The rudimentary "W" in the upper curve is paralleled by a more rudimentary one in the lower curve.

We have carried the lower curve through the year 1902 as a suggestion of the course of pig-iron production next year and the year following. It will be seen that the descending curve of 1913 is about one year nearer the panic of 1907 than is the dip of 1900 to the panic of 1893. So many factors are present in the situation today that were not found in the corresponding year of the previous panic period that prophecy becomes highly venturesome. However, the diagram must be considered suggestive in view of the close parallelism of lines which might be projected, representing the average or trend of the respective curves.

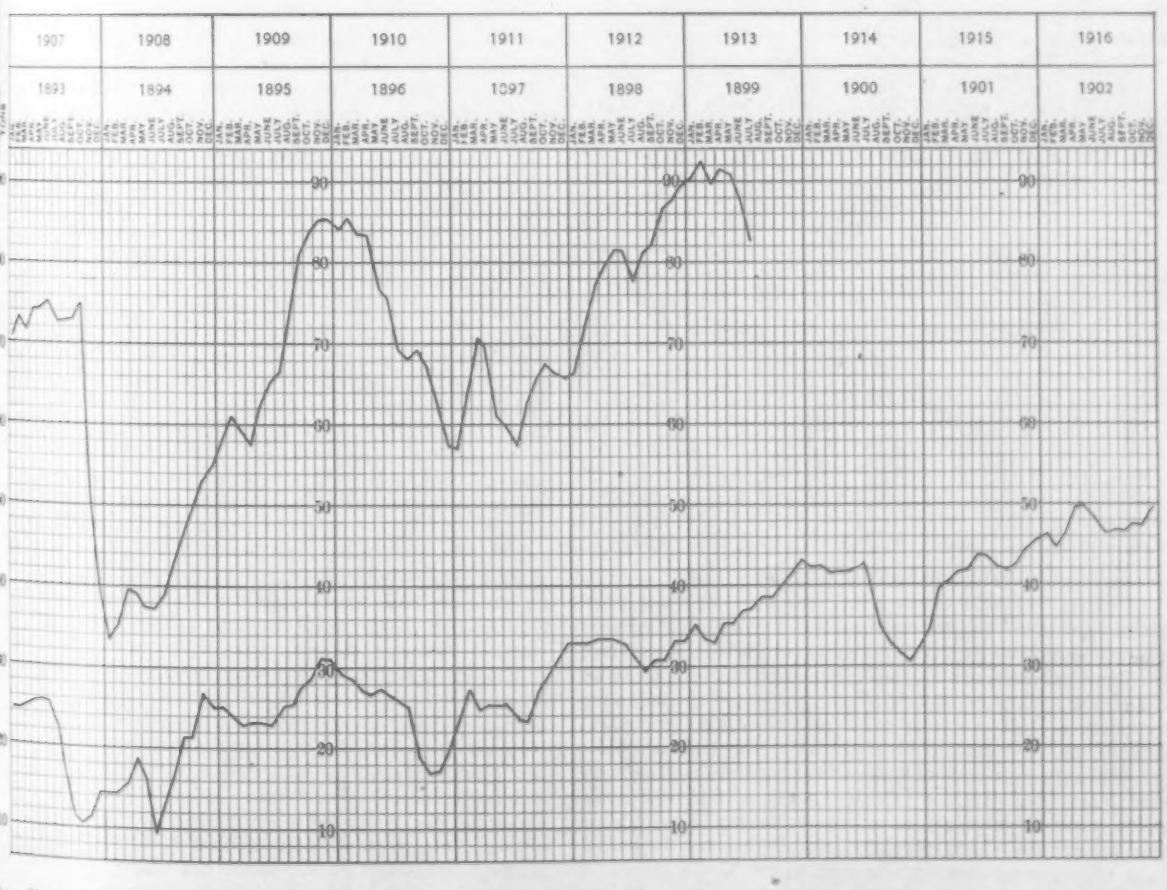


Chart Showing the Course of Pig Iron Production (per Day) in the United States in the Years Following the Panic of 1893 (Lower Curve) and in the Years Following the Panic of 1907 (Upper Curve)

British Iron and Steel Exports Still Increase

British iron and steel exports for the first seven months of 1913 show an increase both in tonnage and value over the same period for 1912. Excluding ore and including scrap the total sent abroad up to August 1, 1913, was 3,020,413 gross tons as against 2,748,181 tons up to August 1, 1912, an increase of 272,232 tons. In values the increase for the first seven months of 1913 is proportionately greater, the total being £32,972,132 as compared with £25,942,958 up to August 1, 1912. The exports of pig iron continue to show a decided falling off, totaling, including ferroalloys, 642,491 gross tons up to August 1, 1913, as against 756,308 tons for the same period in 1912. The increase in the exports of galvanized sheets up to August 1, 1913, is about 100,000 tons over that for the same period in 1912.

The import figures for the first seven months of 1913 show some increase, being 1,361,171 gross tons of iron and steel, excluding ore and including scrap, as against 1,103,157 tons for the same period in 1912. Values for these periods are respectively £9,128,620 and £6,979,802.

Workmen's Compensation in Wisconsin

After September 1 every employer of four or more persons in a common employment in Wisconsin will automatically come under the revised workmen's compensation law of the State, unless he has filed with the Industrial Commission a notice that he elects not to accept the provisions of the law. To save employers from misunderstandings and unnecessary trouble, the commission is carrying on a voluminous correspondence with employers and sending out thousands of copies of the revised statute, with complete explanations. If an employer files notice that he does not wish to come under the provisions of the law, he is not subject to the compensation act, but will be subject to common law liability in case of his negligence resulting in the injury or death of an employee. Employees in a "common employment" are defined as those working for the same employer in the same general business.

Legal Aspects of Trademarks and Trade Name

What Marks May Be Adopted—How a Right May Be Acquired—What Constitutes Infringement—Remedies Available to One Injured

BY A. L. H. STREET

The fact that the courts are frequently called upon to adjudicate disputes arising out of the use by competing manufacturers of conflicting trademarks and trade names seems to warrant the presentation of the following observations as a matter of general and practical interest to manufacturers and dealers. Basing the statements on judicial decisions, with citations to the law reports in which the more important opinions can be found in full, it will be noted that this article treats questions as to what marks and names may be exclusively appropriated; how the right to such monopoly may be acquired; what constitutes actionable infringement, and what remedies are available to an injured manufacturer.

What Marks and Names May Be Appropriated

A trademark, such as will be protected by the courts, may consist of any distinctive name, word, mark, or peculiar arrangement of words, lines or figures, not previously adopted by a competitor to designate his product. But words which merely describe the nature or quality of an article, the use to which it is adapted, or the city, State or country where it is produced, are not subject to exclusive appropriation as technical trademarks, though geographical names will be protected against unfair competition in certain cases referred to below. Any words which have had no previous significance in the trade, or any newly coined word, may be appropriated.

Designs which merely describe the nature of the articles to which they are applied are no more subject to monopoly than words having that effect. Thus, registration of a trademark representing a ball bearing, as applied to such bearings, has been refused on the same ground that the words "Ball Bearing" would be refused (38 Appeal Cases, Court of Appeals of the District of Columbia, 279). The principle that merely descriptive terms cannot be monopolized has been further applied to exclude appropriation of the word "Computing" to designate computing scales (118 Federal Reporter, 965); "Ever Ready," to designate coffee mills (87 Official Gazette, 1782); "Famous," as applied to stoves (62 Official Gazette); and "Granite," to designate enameled ware (33 New York Supplement, 443). On the other hand, use of the following names has been upheld: "Hoosier" drills, "Home" sewing machines, and "Charter Oak," "Climax," "Empire," "Excelsior" and "Portland" stoves. The word "Monitor" has been held subject to exclusive appropriation to designate injectors; "Sunshine," to designate stoves; and an iron works has been protected in the use of the word "Cyclops" as a part of its trade name (68 Pacific Reporter, 1014).

A personal name is not subject to monopoly as a technical trademark, especially if it is not printed in a distinctive way; and its registration in the Patent Office cannot make it a valid trademark (201 Federal Reporter, 510). But, as stated below, when a personal name has become well-known as a designation for a certain manufacturer's product, he will be protected against unfair competition by a competitor in the use of that name.

Acquiring the Right to Exclusive Use

A dealer with the exclusive right to sell in the United States a patented article made by the patentee in a foreign country is entitled to adopt a distinctive trademark not used by the manufacturer, and will be protected in its use in this country after expiration of the patent, even as against the patentee (205 Federal Reporter, 302). As a general rule, on the expiration of a patent covering a machine, the public acquires not only the right to make and sell the same kind of a machine but to designate it by the name under which it has become generally known (163 United States Supreme Court Reports, 169). But the manufacturer of a patented article, on expiration of the patent, is entitled to the exclusive use of a distinctive mark not descriptive of the article. Applying the same principles to the form of the thing covered by an expired patent, the right to make the device in the form under which it was previously manufactured passes to the public, except so far as the form has been adopted to merely denote the product as that made by the manufacturer who was protected by the patent (178 Federal Reporter, 300).

Acquisition of the right to the exclusive use of a trademark depends primarily on two things: prior appropriation and continued use. Registration is not required except to obtain the benefit of the special remedies afforded by the Federal and State trademark acts. The mark must be affixed to or impressed upon the articles covered by it or upon the packages containing them.

What Constitutes Actionable Infringement

Provision is made by statute in several States for the protection of trademarks under civil and criminal penalties; registration being usually required to make those remedies available. To be registered under the Federal trademark act, a mark must have been used in interstate or foreign commerce, and must be a valid trademark technically, except that any mark which was used exclusively for 10 years before that act was adopted in 1905 will be deemed valid, though not good as a technical trademark. But the fact that a mark is not subject to registration does not necessarily imply that it will no be protected against unfair use by a competitor to deceive the public.

A trademark is subject to abandonment, and, on being abandoned, may be adopted by any one who first appropriates it (68 Southeastern Reporter, 800). But mere suspension of the use of a mark does not amount to an abandonment, which will be declared only on facts which clearly show that the owner intended to forfeit his right to monopoly (204 Federal Reporter, 211). Where a manufacturer had used the letter S in a diamond-shaped geometrical figure, but omitted it from the trademark as registered, it was held that he abandoned that feature to the public (85 Federal Reporter, 637). Incidentally, it was decided in the same case that mere use of a figure, such as a diamond, gives no trademark right in the word designating the figure, if the product has not been known to the trade by the name (85 Federal Reporter, 637).

A valid trademark is infringed, so as to afford a legal remedy to the owner, when a competitor colorably imitates it to pass his product off on the public as that previously sold under the valid trademark. To be actionable, however, the imitation need not be identical; it being sufficient that it is so close as to tend to deceive the public. Whether one mark or brand constitutes actionable infringement is tested by the inquiry whether the similarity between them is such as to be likely to deceive the ordinary purchaser (89 Federal Reporter, 706). But right to enjoin infringement is not affected by any indifference of the public as to whose product is purchased; it being the attempt to dispose of goods by misrepresentation that constitutes the actionable wrong (87 Northeastern Reporter, 751). It is also, unnecessary that proof be offered in an infringement suit to show that any one has been deceived by the imitation of the plaintiff's mark, or that there was any actual intent to deceive, though proof of such deception is strong evidence of both tendency and intent to deceive (158 Federal Reporter, 690).

Under the principles above stated, a trademark for horse-shoe nails, consisting of a check figure covering the face of the head of the nails, has been held to be infringed by a similar check figure, though a plain triangular space was left in the latter (188 Federal Reporter, 20). But a geometrical figure of a diamond was declared not to be invaded by the design of a rough, radiant diamond used on a competing product (85 Federal Reporter, 637, and 89 Federal Reporter, 706). The trade name "Cyclops Machine Works" has been held to have been infringed by a

mpetitor's use of the name "Cyclops Iron Works" (68 cific Reporter, 1014).

Unfair Competition Recognized by Law

In addition to the infringement of technical trade-rks, the law recognizes a kindred species of business ud which is known as "unfair competition" or "unfair de." This branch of the law affords a remedy against e unfair imitation of a competitor's trademark or trade me, though the mark or name be not subject, technically, exclusive appropriation, where the imitation is palpably opted to divert the injured manufacturer's business. e offense is legally defined as consisting in passing off, attempting to pass off, upon the public the goods and siness of one manufacturer as being that of another 00 Federal Reporter, 711).

Thus, although a personal name may not be made the sis of a technical trademark, and every person has the ght to use his own name in any line of business, he will y be permitted to use it in such way as to mislead the blic into believing that in buying his product the prod-t of a better known manufacturer, who previously opted the name in the manufacture of that particular ss of article, is being bought. Hence, a manufacturer "White," "New White" and "Improved White" saw ages, named after the inventor and made under an ex-sive license granted by him, has been declared to be titled to enjoin the inventor from using the name White" in connection with another saw swage subse-ently invented by him (135 Northwestern Reporter, 1). And where valves became known by the patentee's me, Ludlow, and his successors continued their manu-cture after the patents expired, his successors were held have the right to enjoin a rival manufacturer from us-g the word "Ludlow" without an accompanying state-ent sufficiently specific to distinguish his product from t of the original manufacturer, though probably en-led to use the word as descriptive of the character of e valves (166 Federal Reporter, 26).

For the same reasons it is declared by the courts that, ough geographical names are not subject to original ap-opriation, as trademarks, they may by use acquire a condary meaning, indicating not only the place of manu-acture, but, also, the name of the manufacturer, or of the aracter of the product, so that the name thus employed ay be protected against unfair competition (68 South-astern Reporter, 800). Under this rule, the well-known anufacturers of Elgin and Waltham watches have been otected in the use of those geographical names.

Simulation of a well-known manufacturer's product, ch as locks, by copying the form, coloring, lettering and tails of finish, will be enjoined, if the product of the com-etitors is so nearly alike that a casual observer would istake one for the other, especially where the infringed oduct is higher priced than the infringing one (154 ederal Reporter, 37). The copying of an unpatented de-gn of stoves adopted by another manufacturer has been eclared not to constitute unfair competition, however, here only a few of the complaining manufacturer's stoves ad been sold, the design, therefore, not being generally nown to the public, and where the manufacturer com-lained against used a distinctive name and ornamenta-ion (189 Federal Reporter, 26). And the manufacture and ale of stoves under the name "Twentieth Century Laurel," with the name of the maker plainly appearing on he stoves, have been held not to constitute unfair trade gainst another manufacturer who previously sold "Radi-nt Home Stoves" containing fire pots known as "XX entury Fire Pots," that name not appearing on the latter toves, though advertised in connection with the sale there-f (150 Federal Reporter, 141). Nor do manufacture and ale of repair parts for a well-known device upon which atents have expired, by one other than the patentee and aker of the machine, constitute unfair competition, un-ess they are sold as the product of the original manufac-urer (136 Federal Reporter, 641).

The remedy against infringement and unfair competi-ion is suit to recover damages for the injury already one, and to enjoin further injury. As a general rule, the amages recoverable are measured by the loss of the com-laining manufacturer's profits, based on the profits he would have made on the sales effected by defendant. If actual damages cannot be proved, nominal damages and osts may be awarded.

Sanitation at Lake Superior Iron Mines*

Improved Operating and Living Conditions Under Policies Adopted in Recent Years

BY W. H. MOULTON†

Sanitation is the practical application of knowledge and science to the preservation of health. There is no one thing that more directly affects the successful operation of our mines than the health and well being of the men, and we are now coming to realize that it is a practical as well as a scientific matter. The value of sanitation is being recognized today in all branches of industry, as well as in its effect upon a community as a whole. Our higher educational institutions have regular courses in this subject and men are graduated in this branch of engineering. It is undoubtedly true that the better living conditions and better physical health make for more satisfactory service. The health of the men may be conserved in many ways which are of practical application around our mines. Much has already been accomplished and due credit should be given to the many companies that have given special consideration to the health of their men.

Recent Hygienic Changes

The old wooden dry, of a comparatively few years ago, is now being replaced by the modern one with ample hot and cold water, individual basins or buckets, lockers for the street and mine clothes, and drying and ventilating systems which effectually take care of the wet clothing of the miner. The plan of suspending the wet clothes by means of a rope or chain, with individual lock, has much to commend it. Shower baths, which are a part of all the modern drys, have made it possible for the men to bathe who have not the proper facilities at home. Their constant use has demonstrated their value.

The introduction of water closets in the drys has not always met with complete success, but in the majority of cases it is working very advantageously and improving the underground conditions. Dry closets should be placed in every main level and they should be provided in proportion of one to every twenty-five men. These closets should be made of wood or iron of a size to be conveniently handled by two men. They should be taken to the surface and washed out with the hose when emptied. Lime should be kept convenient to the boxes and used regularly. There is no more fruitful source of disease than the human excreta left in the mine workings.

The water that the men drink should have the most careful attention and under no circumstances should the men be permitted to drink water that is not known to be pure. This can only be made possible by furnishing good water so that the men can readily obtain it. The plan of the Oliver Iron Mining Company in providing bubbling fountains, thus doing away with the old dirty drinking cup, is also to be highly commended.

Anything that will lessen those diseases frequent among our miners, such as tuberculosis, typhoid, and other contagious or communicable diseases, should be carefully considered. There should be a more rigid quarantine in cases of contagious diseases, and it is desirable that the mining companies cooperate more fully with the health officers and that such regulations be made and enforced, so that our unenviable record in contagious diseases, especially in diphtheria and scarlet fever, may be greatly improved upon.

Owing to the relation that the physicians bear to the mining companies, they may hesitate to suggest things which might appear as criticism of existing conditions or methods of mine management, and should therefore be given full authority to correct undesirable conditions. I believe we would get better results in this matter of sanitation by employing the physicians, at a stated added remuneration, to make periodical inspection of the entire properties.

Proper ventilation should be provided in all of our mines which would add to the efficiency of the men and incidentally prolong their lives. Tuberculosis and similar diseases would be less prevalent.

*A paper read at the Minnesota meeting of the Lake Superior Mining Institute, August 26-30, 1913.

†Secretary pension department, Cleveland-Cliffs Iron Company, Ishpeming, Mich.

Better Conditions in Workmen's Homes

The sanitary condition of the home has a great influence on the lives of the men. What can reasonably be expected of a man living in unhealthful surroundings? I believe that there is a duty that the mining companies owe to men employed by them and the community in which they live. One of the most efficient ways of fulfilling this obligation is in providing satisfactory homes, with healthful surroundings for the men and their families. Any work of this kind must be wisely done and in such a way that the men will be led to cooperate in it, so that there will be no suggestion of paternalism in its methods or manner of inforcement. The importance of providing houses for rental is generally recognized; but after the house is provided it is just as essential that its condition be not neglected. We have seen houses with no provision for waste water, which must be thrown out upon the ground. The old boxed-in cupboard sink may yet be found, which is a place for refuse and vermin, and is so frequently a rotten, dirty, slimy hole. If there are such, let them be torn out.

The drainage around our houses and other properties requires careful attention. Ditches should be dug and kept open, even if the boys fill them up, and no stagnant water left to breed mosquitoes and infection.

Garbage and refuse should be deposited in covered receptacles, preferably galvanized iron cans, and where such services are not rendered by the city or village, the companies should provide for its regular collection and disposal not less frequent than once each week. It has been found feasible in some places to have the occupants of the premises purchase the cans, which are supplied at wholesale rates, or through the company at cost, with the understanding that proper collection is assured. Rubbish should not be dumped around promiscuously but deposited in a designated place, collected, and disposed of. Few of the men have time or facilities for economically doing this and if not looked after by the city or the company, it will not be taken care of at all satisfactorily. A refuse burner, costing very little, can be so located as to make the disposal of rubbish a simple matter and comparatively an inexpensive one.

It is desirable in many cases to permit the keeping of a cow or horse, but provision should be made for the care of the manure. It should not be allowed to accumulate from month to month but should be removed promptly. It also should be treated with chloride of lime, or with a kerosene carbolic acid mixture.

The companies should encourage the beautifying of home surroundings but it is even more important to see that the sanitary conditions are what they should be. In those localities having no sewer connections, the question of out-houses is a serious matter. Too often the outhouse is set on the ground with no proper receptacle for the human excreta which often spreads over the ground, even if a pit is dug. This is frequently allowed to collect throughout the season thus becoming a menace to the family. Often the houses are more or less open; vermin enters without hindrance. The ever-present disease-carrying fly freely finds access, goes from there to the house, feeds on the baby, and has even been known to be on the household food. We have just begun to appreciate the danger from these pests. The companies which have already set us an example in their campaign against the fly should be congratulated, and it should also stimulate the rest of us to make an equal effort. These out-houses should be provided with a proper receptacle which should be emptied at regular and not too separate intervals, and properly cleaned. Either earth, slaked lime or chloride of lime should be constantly used.

Educational Work

Much good can be accomplished by the teaching of sanitation in the public and parochial schools. Some of us may be too old to take kindly to the need of sanitary precautions, but it is not too much to expect that the young may be taught to look on these matters as important and to a considerable degree help to improve conditions.

The value of the physical inspection of school children is only just beginning to be appreciated. It should be in effect in all of our communities. It is a health precaution of great merit.

The most efficient agency in extending the benefit of this work of sanitation is the visiting or public health nurse. A number of mining companies in the Lake Superior region have already introduced this service with much success. No other person can have the same opportunity of reaching the homes and the members of the families and assisting in the understanding of the benefits to be derived from fresh air, cleanliness and other sanitary precautions. The importance of fresh air cannot be emphasized too strongly.

The advantage of all this is a better home life, the prevention of serious contagion, and the men in better condition for work. Anything that tends to the more regular work of the men is well worth consideration.

The mining companies of the Lake Superior region are to be commended for the work that has been done for the men, their families, and the communities in which their operations are conducted; but with this commendation must come the realization that there is still much to be accomplished. This can best be done by making some one person directly responsible for the execution of the plans and methods of sanitation authorized by the mine manager.

The employees in the plant of the Phillips Sheet & Tin Plate Company, at Clarksburg, W. Va., who went out on a sympathetic strike recently, on account of the trouble at the Steubenville works of the company, decided to return on the terms proposed by the company, and that plant is now in practically full operation. It is expected that this will have considerable effect in hastening a settlement of the trouble at Steubenville, as the men there were relying on the support of the Clarksburg force. At present 9 of the 12 mills at the company's Pope works are in operation, and it expects to have the whole of them on in a short time.

The William B. Pollock Company, Youngstown, Ohio, made a shipment on Monday, August 25, of 45 cars of plates and other material for the new blast furnace which this company will build for the Broken Hills Proprietary Company at Newcastle, New South Wales, Australia. The train was run solid from Youngstown to New York, and in that city the shipment will be loaded on a chartered steamer by which it will be conveyed to Australia via the Suez Canal. The Pollock Company will erect this blast furnace complete, sending its own men to Australia to do the work.

The largest furnace for annealing steel castings in Great Britain, and probably in the world, is being built by the Darlington Forge Company, Ltd., Darlington, England. The interior dimensions are 48 ft. x 18 ft. 6 in. x 11 ft. 6 in. with a right angle projecting chamber 13 ft. 6 in. x 11 ft. x 9 ft. The furnace will accommodate the largest stern or rudder frame yet designed and will anneal single castings up to 75 tons in weight. The fuel is bituminous coal.

The Heppenstall Forge & Knife Company, Pittsburgh, Pa., maker of forgings, shear knives, die blocks, etc., has opened a branch office at 874 Rockefeller Building, Cleveland, Ohio. The company will be represented in Cleveland by George I. Allen, formerly assistant sales manager of the Cleveland City Forge & Iron Company, who will also act as Cleveland selling agent of the Canton Steel Foundry, Canton, Ohio.

The College of Engineering of the Polytechnic Institute of Brooklyn has issued its booklet of technical courses for evenings, in engineering, chemistry, physics, mathematics, drawing, history, economics and languages. The courses are intended especially for those engaged in active daily work. No formal examinations for entrance are required except for those seeking a degree. The season opens Monday, September 29.

R. E. Bedd has been elected president of the Massillon Rolling Mill Company, Massillon, Ohio, to serve until the annual meeting of directors of the company in January. He is president of the Canton Stamping & Enameling Company, Canton, Ohio.

Good progress is being made on the building of the open-hearth steel plant of the Brier Hill Steel Company at Youngstown, Ohio, but it is not expected that any of the furnaces will be ready for operation inside of 60 days.

Pittsburgh and Vicinity Business Notes

A large new engine is being installed in the No. 2 sheet mill of the Allegheny Steel Company, Brackenridge, Pa., and this department is closed down until the additions have been completed. The open-hearth steel plant, the sheet-bar mill and eight sheet mills in No. 1 department are in operation.

The Flood City Mfg. Company, Johnstown, Pa., has asked for estimates on the construction of two steel and concrete factory buildings. J. L. Hershberger is secretary.

The new plant of the Weirton Steel Company, Weirton, W. Va., is nearly completed and will be put in partial operation next week. The whole plant will be electrically driven, current being secured from the West Penn Traction Company, operating two 1500-hp. motor sets. Direct-current drive has been selected to secure flexibility in speed variation, which is an important factor in the cold-drawn process. The company will make a full line of cold-rolled strip steel.

In July, 1912, work was started on the building of an open-hearth steel plant by the Carnegie Steel Company at the Edgar Thomson mills, Bessemer, Pa., to contain 14 50-ton furnaces. In spite of delays in getting material, shortage in labor, etc., excellent progress was made, and on Thursday, August 21, one furnace was started, followed by another this week. The company expects to start an additional furnace about every 10 days until all are in operation. The new plant will have a capacity of about 800 tons of steel per day. A new rail mill is also being built at the Edgar Thomson works to roll standard sections up to 100 lb. or heavier. This mill will not be ready until about the middle of next year.

The annual outing of the employees in the general offices of the American Sheet & Tin Plate Company, Frick Building, Pittsburgh, was held at Alameda Park, Butler, Pa., on Saturday, August 23. There was a very attractive programme of entertainment.

The Carbon Steel Company, Pittsburgh, has been notified that it has been awarded a contract for 3900 tons of acid steel plates for the new American dreadnought to be built by the Navy Department. The price is $187.04 per ton. Press statements that this material is armor plate are incorrect, as it consists of specially treated protective deck plates and does not come under the designation of armor plate. The Carbon Steel Company has never made armor plate, not having the equipment to do so.

Receiver for Canadian Iron Corporation, Ltd.

On August 21 the Canadian Iron Corporation, Ltd., made application at Montreal for the appointment of a receiver. F. F. White, of New York, was appointed. This company is one of the most important in Canada, having a capitalization of $4,637,933 in bonds and $7,741,300 in stock. It was formed in December, 1908, constituting a merger of the properties of the Canadian Iron & Foundry Company, Ltd., the Canada Iron Furnaces Company, Ltd., John McDougall & Co., and the Annapolis Iron Company, Ltd. The plants are located at Londonderry, Nova Scotia; Hamilton, St. Thomas and Fort William, Ontario; Montreal and Three Rivers, Quebec, comprising coke and charcoal blast furnaces, cast-iron pipe foundries, etc. Thomas J. Drummond, Montreal, is president, and George E. Drummond, vice-president. The purpose of the reorganization is to endeavor to reduce the fixed charges.

The problem of the safety movement is a psychological and not a mechanical one, in the opinion of the Committee on the Practice for the Prevention of Accidents, of the Lake Superior Mining Institute, which committee submitted its report at the Minnesota meeting. The most efficient work in the cause of safety must be done by methods which will constantly keep before the mind of every employee the fact that upon him rests an individual and personal responsibility. It is felt that efficiency in safety can only be attained by education and constant agitation of the subject and the hearty co-operation of the employee with the management. This fact implies, the report continues, that the management should show its willingness to do its part in the installation of guards and appliances.

Chas. Mundt & Sons Resume Quickly After Fire

In a fire that leveled several city blocks in Jersey City, N. J., August 20, several manufacturing plants, including that of Chas. Mundt & Sons, perforators of sheet metal, were destroyed. The damage to machinery in the plant of Mundt & Sons is estimated at $117,000 and the loss, including the buildings, at $150,000. The aggregate loss resulting from the fire was about $500,000. Immediately after the fire Mundt & Sons engaged temporary offices and factory space at 101 Fairmount avenue and August 27 had resumed the work of turning out their perforated product. Three heavy presses taken from the ruins were found to be in fairly good condition, while orders were given without delay for six others. The improvised plant will be making deliveries in a few days. In addition to the work of providing temporary facilities the firm also contracted for the construction of a new plant on the site of the old one which will be in readiness for occupancy in about six weeks. One portion of the building which is to contain offices and stockrooms will be two stories in hight, 30 x 120 ft., while another portion will be partly one and partly two stories, 100 x 160 ft., and will house most of the machinery. The construction will be of brick and concrete, with steel sash and wire glass windows. Work on the new factory will be carried on day and night. The fire also destroyed the cooperage of C. Heidt & Son, the works of the Apex Chemical Company, the property of Crane & Brother, dealers in roofing materials, and did minor damage to other factories and warehouses.

Welsh Works and the Tin Plate Trade in Canada

Welsh tin-plate manufacturers have not yet succeeded in their efforts to have official protests made from Great Britain to the Canadian Government against the so-called dumping of American tin plates in Canada. The London Iron and Coal Trades Review says that the British Board of Trade has refused to make representations to the Canadian Government on the subject and therefore the South Wales Tin Plate Conciliation Board has taken up the matter with members of the House of Commons. The same journal says editorially: "We have already practically lost the American [tin plate] market, our total exports thither in the calendar year 1912 amounting to no more than 2135 tons, while our exports to Canada fell from 12,400 tons in 1911 to 7000 tons in 1912. * * * From 1890 to 1901, in which latter year we exported to Canada about 27,000 tons of tin plates, we had that market entirely to ourselves. American exports thither began in 1902, with 1900 tons; in 1912 they totaled 42,000 tons."

A yearly cash bonus to the shift bosses in iron mines is suggested by Edward Higgins, district engineer for the United States Bureau of Mines, at Ironwood, Mich., as a means for securing the co-operation of those foremen who are least influenced by the movement to secure thorough safeguarding in the mines. The idea is discussed at some length in a paper on "Safety in the Mines of the Lake Superior Iron Ranges" read before the Minnesota meeting of the Lake Superior Mining Institute. One point is that the bosses and the men under them are so bent on gaining production, and thus an immediate money reward, that they take chances in which they should be discouraged.

A contract has been taken by the Republic Iron & Steel Company to make 800 tons of socket iron for the Youngstown Sheet & Tube Company, Youngstown, Ohio. This will be turned out from the 16-in. mill of the Mahoning Valley works. The arrangement is that the Republic Company will make iron for the Youngstown Company until the wage scale with the United Sons of Vulcan is settled. It is stated that the latter company will not sign the Sons of Vulcan scale, but will shortly declare its puddling mill open and give employment to any puddlers that may apply.

No. 1 blast furnace of the Republic Iron & Steel Company at Haselton, Ohio, which has been idle for some time for relining and repairs, will be blown in this week. The new 20-in. mill at the Brown-Bonnell works of this company will also be started this week. Power for the mills is furnished by the engine formerly used on the 18-in. mill at the Valley works, which has been closed.

Personal

H. S. Snyder, vice-president Bethlehem Steel Corporation, has returned to New York after a visit to Scotland, where he was conducting negotiations with British shipbuilders for the placing of contracts for the ten vessels which the Bethlehem Steel Corporation plans to build to carry its ore from the mines in Chile to this country.

Earl E. Hummer, formerly with the Oliver Iron Mining Company, who has been chief engineer for the Great Northern ore properties in Minnesota, has been appointed general superintendent of mines.

James L. Gough, formerly sales manager for the E. L. Essley Machinery Company, Chicago, has become associated with the Lake Erie Machinery Company at Cleveland, Ohio, in a similar capacity.

Edson O. Sessions has opened an office in the Marquette Building, Chicago, Ill., for consulting and expert engineering services. He has had over 20 years experience in construction and engineering work.

Philip J. Kroll has been made Pittsburgh representative of the International Oxygen Company, with office at room 1023 Park building.

F. C. Maurer, long manager of the Philadelphia office of Spang, Chalfant & Co., Inc., will withdraw from that connection September 1 and will enter the real estate business in that city. The company's office in Philadelphia will then be discontinued.

L. W. Barnette, for many years secretary and sales manager of the Franklin Steel Company, Franklin, Pa., has resigned to accept a position with the Blaw Steel Construction Company, of Pittsburgh, with headquarters at 165 Broadway, New York, where he will handle the sales of transmission towers, steel poles, and other structural steel products of the company in Eastern markets.

A. Kauffman, formerly assistant to the president of the Link-Belt Company, has been made general manager of the Philadelphia works at Nicetown, Philadelphia, Pa.

Henry Dreses, president Dreses Machine Tool Company, Cincinnati, Ohio, has returned from a vacation spent in Canada.

C. B. Fowler, Ironton, Ohio, long identified with the iron industry at that point, has been appointed general superintendent of the Marting Iron & Steel Company.

Lake Superior Mining Men at Duluth

The members of the Lake Superior Mining Institute gathered at Duluth Tuesday, August 26, to the number of 200, to participate in the 18th annual meeting, which will be held at various points on the Mesaba range. The members were guests of the Minnesota Steel Company on a trip of inspection to the new Duluth steel plant, going by boat up the St. Louis River. At midnight the party left by special train for Biwabik, Minn. Mines between Biwabik and Virginia were to be visited Wednesday and a session for the reading of papers was appointed for Wednesday evening at Virginia. Thursday will be spent at points between Virginia and Hibbing, and mines on the west end of the range will be visited Friday. Inspection of the Oliver Iron Mining Company's great concentrating plant at Coleraine comes on Saturday.

Cincinnati Molders' Strike Settled.—The strike of molders in Cincinnati foundries, which had lasted about six weeks, was settled the past week on the basis of an advance of 25 cents a day or to $3.50. There is the additional proviso that on October 1, 1914, the minimum will be advanced to $3.60 a day.

The American Engine & Electric Company, Bound Brook, N. J., has taken over the business of the American Engine Company. Increased facilities will be provided for the manufacture of the American-Ball high speed steam engines which have been built by the American Engine Company for the past 17 years, as well as a complete line of electric motors and generators. The officers of the new company are Hugh C. Pierce, president and treasurer; William T. Hensley, vice-president and secretary; F. O. Ball, general manager, and F. H. Ball, consulting engineer.

Obituary

EDWARD MENDINHALL, founder of the Marshall Iron Company, Marshallton, Del., for many years engaged in the manufacture of sheet iron, retiring about 10 years ago, died at his home in Wilmington, Del., August 10, aged 8[illegible] years. He leaves a widow, one son and two daughters.

ROY WISE, secretary and general manager of the Globe Coal & Coke Company, Pittsburgh, died recently at his home in Wilkinsburg, Pa. He was formerly connected with the Keystone Coal & Coke Company.

GEORGE S. JOHNSTON, head of the Johnston Tinfoil & Metal Company, St. Louis, Mo., died August 20, aged 49 years.

To Extend Beloit Plant of Charles H. Besly & Co.

Charles H. Besly & Co., Chicago, Ill., have awarded the contract for an extensive addition to their plant in Beloit, Wis. The plans provide for a building, 70 x 253 ft., three stories and basement, the latter 46 x 70 ft., to adjoin the company's present three-story building. The Newton Engineering Company, Milwaukee, has the contract and it is hoped that occupancy may be had in March or April, 1914. In addition to the main building there will be constructed a power plant with coal pocket, boiler, pump and generator rooms, and a smoke stack 100 ft. in hight on the site of an old frame building in which the Besly business was started in Beloit in 1886. The power plant will contain two hydroelectric generators of the vertical shaft type with rotating fields direct-connected to high-speed turbines. Oil pressure governors will regulate the turbines. The extension to the Besly plant will make available 65,000 sq. ft. of floor space, with an additional 20,000 sq. ft. of finished floor covered by temporary roofs. The new structure will be of reinforced concrete with steel sash.

Canada's Pig Iron Imports.—The Bureau of Statistics of the American Iron and Steel Institute shows the imports of pig iron, ferromanganese, etc., into Canada in 1912 amounted to 261,152 gross tons, as compared with 201,529 tons in 1911, 234,606 tons in 1910 and 148,247 tons in 1909. Of the 1912 total 17,687 tons was ferromanganese and other ferroalloys, as compared with 15,380 tons in 1911, 16,875 tons in 1910 and 15,802 tons in 1909. The total for 1912 also includes 103 tons of charcoal pig iron, as compared with none in 1911, 14,380 tons in 1910 and 369 tons in 1909. Buffalo furnaces furnish a considerable part of Canada's pig-iron importations. Canada exports very little pig iron, ferrosilicon, etc. In 1912 the exports amounted to 6229 gross tons, as compared with 5241 tons in 1911, 8717 tons in 1910 and 4521 tons in 1909.

The oxy-hydrogen flame under water is said to be successful with a special form of burner recently invented. According to the Engineer of London, this burner consists of an ordinary oxy-hydrogen burner with the addition of a bell or hood shielding the gas orifice from the water and a compressed air supply. Information from the inventor tells of successful demonstrations where, at a depth of 16 ft. under water, a bar of iron 2½ in. square was cut through in 30 sec. and a 12-in. slot was cut in a 13/16-in. plate in 1½ min.

The Cleveland Tool & Supply Company has moved into its new quarters on West Sixth street, Cleveland, Ohio, where it occupies four stories and a basement, which provide 68,000 sq. ft. of floor space, or three times the room it had in its former quarters. C. C. Coventry is president and treasurer; F. C. Wittich is vice-president; W. W. Kelly is secretary, and Charles S. Wright is manager of the seamless steel tube department.

The exports of merchandise from the United States in July were valued at $160,515,941, which is much in excess of the exports of that month in any previous year. The imports were valued at $139,281,227, which is about $8,000,000 in excess of the June imports, but over $9,000,000 less than in July, 1912. The excess of exports for the month was $21,234,714, against an excess of exports of only $218,617 in July, 1912.

The Coleraine Iron Ore Washing Plant

(Continued from page 455)

ing the main shipping track on the east side of the plant these cars are hauled by an electric locomotive to a rock dump a short distance beyond the confines of the plant.

The concentrate receiving bin is large enough to accommodate the entire unit and is built of steel and of about 90 tons capacity. It is provided with discharge flips through which this concentrate passes into railroad cars on the tracks below.

The following arrangement gives the power distribution for the unit: One 100-hp. motor is used for driving the cone-shaped trommel, two log washers and the two turbos. One 15-hp. motor is used for driving the concentrating table and chip screen. One 20-hp. motor drives the four Frenier pumps serving the unit. The concentrating equipment contained in each unit thus includes: One receiving bin, one grizzly, one conical screen, one belt conveyor, two 25-ft. log washers, two 18-ft. log washers, six steel steeling tanks, 20 Overstrom concentrating tables, four Frenier pumps, two steel dewatering tanks, one rock pocket, one concentrate bin.

The Process of Concentration

At the mines the crude ore is loaded directly into hopper cars of an average capacity of 40 tons of this material. The cars are of pressed steel of Sommers and Pressed Steel Car Company construction. Train loads of these cars are hauled over the receiving tracks and over the viaduct approach to the top of the mill and there dumped directly into the receiving bins. In these receiving bins the ores are attacked by a stream of water from the hydraulic nozzle referred to and sluiced down through the opening in the lower end of the bin over the grizzly bars, which eliminates the larger pieces of taconite included in the shipment. This rock is removed from the top of the grizzly by hand into the rock pocket provided for each unit. The material passing through the grizzly is conducted over the connecting apron into the revolving trommel. The oversize material in this trommel advances through it and is in passage subjected to a thorough stirring and rubbing process as well as a heavy spray of water from the spray-pipe arranged for this purpose. After being thoroughly stirred and washed off the content of this trommel passes on to the picking belt provided and is here hand sorted. The rock material is thrown into the chutes leading to the rock pocket whence it is loaded into cars and by an electric locomotive hauled to the rock dump. The coarse material remaining on the picking belt falls directly into a steel chute which conveys it to the concentrate bin immediately in front. The material obtained is known as belt product and consists of lump ore concentrate of sizes larger than 2-in. mesh.

The material passing through the conical screen or trommel falls directly into the underlying junction-box, half of the material going over each of the two log washers provided on either side of this junction box. In these log washers the material is subjected to a combined stirring and abrasive action produced by the paddles of the twin screws revolving therein, in water which enters the log washer under pressure through the three bottom hutches. The introduction of water under pressure into the bottom of this log washer is a decided improvement over earlier constructed log washers, and is an important provision in that it prevents dead material from lying at the bottom of the box. The action of the log washer in this process is that of a large, efficient, over-ready classifier-concentrator and disintegrator. All pieces more or less disintegrated are, through the stirring effect of the paddles, the friction between them and the pieces with which they come in contact, as well as between the pieces themselves in this ever-moving mass under strong water action, more or less broken up into their component parts —grains of sand and pieces and particles of ore.

In the operation the heavy flow of water introduced into the machine both with the material itself as well as from the bottom carries the sand toward and over the tail-board at the lower end of the machine. The heavy material on the other hand, consisting largely of iron ore varying in size from 2 in. to grains, is forced by the action of the paddled twin screws towards the raised or upper end and there discharged as log product into the concentrate receiving bin. The overflow from the log washer is then passed through the chip screen for the purpose of eliminating pieces of wood, waste and other foreign substances. From the chip screen the material is led into what is known as the first set of settling tanks, one on each side of the unit. The heavier material is allowed to settle and the spigot product fed to the two turbos below.

As stated before the turbo is in construction similar to the large log washer but smaller, and the operation of the machine is also similar. The overflow from the settling tanks above is passed into a second pair of tanks. The overflow from these is carried out of the mill, the spigot product is conveyed into the table room and there divided over two sets of 5 Overstrom tables, each set serving each tank. The concentrate obtained in the upper end of the turbo is fed directly into the concentrate receiving bin of the unit. The overflow from the turbo is passed into a third pair of settling tanks. The overflow from these is passed out of the mill. The spigot product is carried into the table house and there dealt with in a manner similar to the way in which the spigot product from the second pair is handled.

The concentrate from the 20 tables serving each unit is conveyed through the four Frenier pumps serving the unit into the de-watering tank, the spigot product of which falls directly into the concentrate receiving bin directly beneath. All tailings from the settling tanks and tables are discharged into Trout Lake below the mill through a 4-ft. wood-lined concrete flume.

Safety Devices

The great amount of thought which has been put into safety devices and the minute detail into which those in charge have gone make a complete description impossible in a paper of this kind. The first application of a safety feature is in preventing the crude ore from falling through the approach trestle from the cars to the ground. The great height of this trestle would make an injury from this source very serious This is prevented by a decking which also eliminates danger of fire from the sparks of passing locomotives. A structural steel hand railing extends the entire length of the trestle on both sides and is supplemented by a toe-board at its bottom.

Within the building, at the receiving bins, the most apparent features are first, the peculiar arrangement of railings and walks which compels the working man unconsciously to guard himself from passing trains, and second, the covered stairways and landings by which the sluicer helpers are enabled to work beneath the tracks with safety and freedom. Within the mill proper, at a point where the ore is washed from the bins into the revolving conical screens are placed a large heavy hinged gate and a stationary wall which serves as a sort of breastwork in front of the sluicer. The stationary walls affords the worker safety from sudden slides of ore while sluicing, and the hinged door protects him from the same danger when ore is being dumped into the bin.

At the picking belts hoppers are provided located conveniently near to both belt and the men. While those are built up high enough to greatly facilitate removing the waste rock from the belt, their primary purpose is to prevent the men from falling into the pockets beneath. The chutes from these pockets which receive the waste rock were provided with the customary quarter-pan or pocket stops, but as these did not prevent small pieces from rolling out beneath them down on to the heads of passers-by, it was necessary to provide an additional means to prevent this. Such a device consisted of a special counterbalance gate or dam made of steel plate. The peculiar location of the stop itself and the point from which it was to be operated made this a difficult problem. The electric tram cars which carry the rock from these chutes to the dumps are provided with automatic gongs which ring when the cars are in motion and warn the workmen of their approach. In the basement a generous lighting system helps in promoting safety, where steel gear housings and wooden belt troughs are also used.

Of the many miscellaneous devices the most important of these are: the covering of every gear, belt, pulley and moving part throughout the mill and the placing of safety collars on all shafting; enameled iron signs warning operators at every conceivable point of danger; signal bells employed when starting all mill machinery. Permanent

stairlike platforms were constructed beneath the receiving bins to enable workmen to remove the bolts that hold the wearing plates when repairing them. Stairways were everywhere provided rather than ladders, and all of them were covered at the backs, thereby preventing material from falling or being kicked through them on to the head of persons beneath. Perhaps the greatest of all features which protects the workman in his routine duty about the mill is the most carefully planned and permanently constructed system of railed walks. These lead everywhere. They are rigid and strong to the last degree. Their railings are of steel pipe, their stringers and joists are of steel beams. Their treads are of the heaviest matched flooring and their sides are protected by the ever-efficient, though obscure, toe-board. Records show that in this item alone 32,300 lin. ft. of 1¼-in. standard pipe with the necessary fittings, and 12,450 lin. ft. of 2 x 8-in. surface pine boards have been used.

Production

The plant produced in 1910 with two units in operation, 610,000 tons; in 1911 with five units in operation, 1,978,000 tons; in 1912 with five units in operation, 2,555,000 tons. The construction of the plant, including power installation, water supply and necessary track arrangements, involved an expenditure of approximately $1,500,000.

The total amount of concentrate produced by the various machines in the unit depends largely on the character of the crude ore treated. The tabulation will, however, give a general idea.

Production in Percentage of Total Concentrate

Belt product	3 to 35	Depending on character of crude ore.
2 logs product	60 to 85	
2 turbos product	2.5 to 10	
20 tables product	1.5 to 6.5	

Concerning the size of the product obtained, it may be stated that the belt product is all larger than 2 in. Of the log product 90 per cent. is coarser than 40 mesh and 4 per cent. finer than 100 mesh. Of the turbo product 15 per cent. is coarser than 40 mesh and 32 per cent. finer than 100 mesh. Of the total table product 85 per cent. is finer than 100 mesh and 50 per cent. is finer than 200 mesh.

The Machinery Markets

Although slight improvement or an encouraging outlook is reported from a few cities, quiet conditions, such as are usual in August, are the rule in most machinery markets. Small deals make up the total of trade everywhere. Both sales and inquiries are slow in New York, while collections are unsatisfactory. In Philadelphia the volume of orders is not large. The molders' strike has been settled in Cincinnati, and the trade has gained encouragement from an improvement in the export business and some quiet buying on the part of the railroads, all of which has made the general situation better. Cleveland reports a quiet market with inquiries light, but normal, considering the season. Milwaukee is encouraged as to the outlook, and shops are fairly busy. New inquiry indicates an improvement in Detroit, although small sales are in the majority. Business this month in the Central South was so much larger than expected as to be a cause of satisfaction. The crop situation has continued to improve in the St. Louis territory and in agricultural implements there has been notable activity. In Texas the building trade and business generally have kept up in a pleasing way, while interurban railway developments, which are expected to create business, are attracting attention. On the Pacific coast a waiting market is still the feature, with trade looking forward particularly to navy yard lists soon to be issued. Woodworking and general contractors' machinery are quiet and no great betterment is expected in these lines until money becomes more available.

New York

NEW YORK, August 27, 1913.

Local demand is quiet both as to sales and inquiries. Small requirements are appearing here and there but they show a tendency to close slowly. Dealers and sales representatives are by no means discouraged, however, as they recognize the season as one when activity may be expected to be at low ebb. They are concerned more with the difficulty of making collections than with the temporary lull in business, inasmuch as many undeniably good customers ask and, in some instances, simply take, unusual extensions of time in which to make payments. In most cases deliveries can be promptly made without excessive delay, while in others production is running a little ahead of sales. No really large lists are before the trade, although estimates have been submitted on about a dozen machine tools required by the Friction Pulley & Machine Company, Hudson Falls, N. Y. The railroads appear to be out of the market for tools and shop equipment, except for an occasional inquiry, such as one now out for a 1000 ft. air compressor for the New York Central.

The Bethlehem Steel Company has awarded contracts for cranes of the mill type for its Lehigh plant to the Alliance Machine Company, Alliance, Ohio, as follows: One 100-ton four girder ladle crane; one 60-ton four girder ladle crane; three 10-ton cranes of 71 ft. span; two 10-ton cranes of 84 ft. span; one 10-ton crane of 50 ft. span.

George Bender, dealer in second-hand dynamos, motors and machine tools, has removed his plant from 82-84 Centre street to 122-130 Centre street, making his fourth move in the past fifteen years, each time to larger quarters. Mr. Bender is equipping his plant with three 18-ft. span cranes and a trolley system for the convenience of handling and overhauling his goods.

The Turner Construction Company, 11 Broadway, New York City, has been awarded the general contract for the construction of a seven-story and basement reinforced concrete factory building, 100 x 100 ft., for the Boorum & Pease Company, Front street and Hudson avenue, Brooklyn, N. Y.

Hubert & Co., water, gas and steam machinery, iron, lead and other piping, sanitary installations and the like, VI Liszt Ferencz-ter, 8, Budapest, Hungary, are in the market for a pressure reducing valve for natural gas for pressures between 1 and 20 atmospheres.

The Turner Construction Company, 11 Broadway, New York City, has been awarded the general contract for the construction of the new 400 x 420 ft. two-story reinforced concrete fertilizer building for the Bradley Works of the American Agricultural Chemical Company, North Weymouth, near Boston, Mass. Work will be undertaken at once.

The Board of Water Supply, New York City, will receive bids until September 2 for a 250-kw. hydroelectric power equipment.

J. M. Cady, director, Elizabeth, N. J., will receive bids until September 22 for a power plant for the tuberculosis farm.

The Bartholomay Brewing Company, Rochester, will erect and equip a 3-story bottling plant at St. Paul and Curtice streets of structural steel and brick construction.

The American Wire Twisting & Splicing Machine Company, Buffalo, has been incorporated with a capital stock of $100,000 to manufacture special wire working machinery. Roy Reed, Leo F. Donnelly, Albert D. Fiveshilling, Henry J. Carrigan and Ludwig C. Stern are the directors. Arrangements are under way for a manufacturing plant.

A new factory building is being completed for the American Carving & Mfg. Company, Jamestown, N. Y.

A large addition is being made to the manufacturing plant of the Star Furniture Company, Jamestown, N. Y.

The J. P. Danielson Company, Jamestown, N. Y., maker of machine tools, is completing and equipping a new factory building in that city.

The city of Jamestown, N. Y., has voted $40,000 bonds for the enlargement and improvement of the municipal lighting plant.

Bids will be advertised for about September 1 by the spital commission, 1312 Main street, Buffalo, for a wer building and an administration building for the w municipal hospital at Kensington avenue and Grider reet, Buffalo. Dr. Edward J. Meyer is chairman of e commission.

The Hahnemann Hospital, Rochester, N. Y., has let e contract for the construction of a boiler house from ans of J. Foster Warner, architect, Granite Building, ochester.

Plans are being completed by Lee & Hewett, archi- cts, New York City, for a three-story silk mill, 52 x o ft., to be erected at Yonkers, N. Y., by Ludwig Lit- ner. Bids are to be received this week.

The Kingston Factory Corporation, Kingston, N. Y., s let a general contract for the erection of a factory ilding, 50 x 130 ft., two stories and basement. A. J. ook, 87 Clifton street, is manager.

The United States Steel Furniture Company, Syra- se, N. Y., which is to erect a large addition to its ant, has increased its capital stock from $375,000 to 00,000.

Hydroelectric power equipment is to be installed at e lower gate and screen chambers of the Ashokan eservoir at Oliver, N. Y. Joseph P. Morrisey, secre- ry of the Board of Water Supply, 165 Broadway, New ork City, is receiving bids.

R. E. Cluett, architect and engineer, 423 River street, roy, N. Y., has completed plans and commenced con- ruction work on a boiler house, 35 x 56 ft., which he ill erect in that city.

Foote & Headley, architects, Rochester, N. Y., are eiving bids for a power plant building, 37 x 44 ft., to e erected by the F. E. Reid Glass Company on Maple reet.

Charles M. Lane, manufacturer of leather goods, 121 ill street, Rochester, will build a four-story addition his factory.

Joseph Kempner, city engineer, Oneida, N. Y., has mpleted plans for a sewage disposal plant to be built the city at an estimated cost of $40,000.

The Wahaneta Silk Company, Catasauqua, Pa., will uild a two-story addition, 50 x 150 ft., to its silk mill.

Contracts will soon be let by Charles Griffiths, presi- nt of the American Bronze Company, 141 Delaware venue, Buffalo, for the erection of a foundry building, x 150 ft., of brick and steel, at Tonawanda and Arthur reet and the Erie Railroad, in that city.

The Susquehanna & New York Railroad Company, as let the contract for car shops, 80 x 100 ft., one story, be erected at Williamsport, Pa. P. M. Newman is resident.

The Continental Rubber Company, Erie, Pa., has let e contract for erection of a four-story factory build- ng, 75 x 226 ft., to cost $70,000.

The G. G. G. Mfg. Company, Warren, Pa., recently ncorporated, has taken over the business of the G. G. reene Mfg. Company of the same place, manufacturer f a patent hame fastener. The G. G. G. Mfg. Company as moved machinery from the Corry Caster Company, Corry, Pa., has enlarged the plant of the corporation it nceeds and plans to manufacture steel stampings and ovelties as well as its regular product. H. P. Stone is resident, C. E. Metzger vice-president, A. M. Meade reasurer and G. G. Greene secretary and general man- ger.

Philadelphia

PHILADELPHIA, PA., August 25, 1913.

The current volume of orders is not large and in- quiries have been unimportant. August will no doubt maintain its record for rather light business. Several air-sized projects which have recently been under ne- otiation progress very slowly and the majority of the ales recently made have been of single tools. There as been no important new demand from the railroads nd few orders are placed against recent inquiries. A air volume of power-plant equipment is under negotia- ion. Second-hand machinery and tools have been in ight demand. Little change is noted in the foundry sit- uation, new business being comparatively light, particu- arly in steel castings.

George Oldham & Sons, manufacturers of pneumatic machinery and appliances, Frankford, Philadelphia, have had plans prepared for a large two-story addition to their plant. The power house will also be enlarged and at a later date the purchase of power equipment and general machine tools will be considered.

The Hellwig Silk Dyeing Company is having plans completed for a two-story dye house, 100 x 200 ft., and a one-story power-house, 90 x 90 ft., to be erected at Mil- nor street and the Delaware River, Philadelphia.

R. M. Baily, of the R. M. Baily Company, Arcade Building, Philadelphia, is now the local representative of the Best Mfg. Company, Pittsburgh, Pa., manufac- turer of valves, pipe, fittings, etc. W. J. Spencer is no longer connected with the local office.

Builders are estimating on plans and specifications for a garage and workshop to be erected at Graver's lane and Northwood street, Chestnut Hill, Philadelphia, for Christopher Hart.

The A. Mecky Company, manufacturer of small ve- hicles, has acquired land at Trenton, N. J., and is having plans prepared for a large plant by G. A. Hunt, of that city, on which work will proceed at once. The factory in this city will be maintained, but on completion of the Trenton plant the output of the company will be dou- bled.

The Frank A. Rolling Company, 141 North Third street, Philadelphia, which has been conducting a manu- facturers' agency, has acquired the manufacturing rights of several specialties and will later acquire a plant for producing them. The company has just been incorpo- rated under Pennsylvania laws with a capital stock of $25,000. Frank A. Rolling is president and John B. Hoen treasurer of the new organization.

Justice Cox, Jr., & Co., Land Title Building, Phila- delphia, are in the market for 10 gondola and 10 flat cars of 50,000 to 60,000 lb. capacity.

A number of builders are estimating on the proposed five-story factory building to be erected for the Ford Motor Company at Broad street and Allegheny ave- nue. The building will be 230 x 370 ft., of brick and steel construction, from plans by Albert Kahn, architect, Detroit, Mich.

William Stellway, Metropolitan Garage, Fifty-sev- enth and Chestnut streets, Philadelphia, is having plans prepared for a one-story garage 140 x 180 ft., to be erected on Thirty-third street above Jefferson street.

The S. Flory Mfg. Company, Bangor, Pa., manufac- turer of hoisting engines, etc., whose plant was recently burned, is erecting temporary buildings which will be equipped with machines already provided for. Plans for permanent structures have not yet been prepared.

The Jacobson Engineering Company, formerly of Saratoga Springs, N. Y., builder of gas and oil engine plants, tank and plate work, etc., has moved to Hagers- town, Md., and has rented the building on the Western Maryland Railroad known as the Old Engine plant. The company advises that the plant is already equipped, though it expects to need more machinery and tools later on.

Coatesville, Pa., has voted $185,000 bonds for water- works.

Kittanning, Pa., will construct a waterworks system to cost $75,000.

The MacDonald Engineering & Construction Com- pany, Wilmington, Del., has been incorporated under Delaware laws with a capital stock of $10,000. H. L. Mullin is named as incorporator.

The Board of Awards, Baltimore, Md., will receive bids until September 10 for several pumps and for elec- trical equipment.

The Silver Spring Water Company, Silver Spring, Md., will receive bids until September 15 for a pumping engine.

Chicago

CHICAGO, ILL., August 25, 1913.

Franklyn R. Muller, who has been operating a small plant at 312 May street, Chicago, has moved his ma- chinery installation to Waukegan, Ill., where he will continue to manufacture a composition flooring.

The Bell Company, Springfield, Ill., will shortly re- move its factory to Fort Madison, Iowa. The com- pany makes a patent non-clogging pump oil can and other metal specialties.

The Big Four Railroad is planning extensive im- provements at Mount Carmel, Ill., consisting of a new roundhouse to cost $30,000. About $10,000 will be ex- pended for new turn tables to accommodate the pur- chase of 10 engines.

The Foster Sheet Metal Company, Springfield, Ill., has been incorporated with a capital stock of $10,000 by John J. and William J. Foster and Frank M. McGowan and will equip a plant for sheet-metal manufacture.

The Abingdon Milling & Cattle Feed Company, Abingdon, Ill., has been incorporated with $18,000 capi- tal stock by E. J. Blevins, L. H. Robertson and S. H. Whitenack and will equip a feed plant at once.

Ground was broken at Bloomington, Ill., August 21

for the new shops of the Chicago & Alton Railroad which are to cost, equipped, about $2,000,000. The Westinghouse-Church-Kerr Company has the contract.

The plant of the International Steel & Iron Construction Company at Evansville, Ind., was destroyed by fire.

The Lake Shore Railroad is making extensive improvements to its shops at Muncie, Ind.

The new factory of the National Engine Company, Waterloo, Iowa, is nearing completion and will be ready for occupancy in about 30 days. The company will manufacture a kerosene engine, friction clutch pulleys and other engine accessories.

A bond issue of $15,000 has been voted for an extension of the city waterworks at Anita, Iowa.

The municipal electric light plant at Prairie du Chien, Wis., was burned August 12 with a loss estimated at $200,000.

A bond issue of $53,000 has been voted by the city of Dexter, Iowa, for a water supply and sewer system. Plans and specifications will be prepared by Frank L. Wilcox, Chemical Building, St. Louis, Mo.

The Exner-Dodge Packer Company, recently incorporated, will locate at Coffeyville, Kansas, where a site for a plant has been purchased. The product will be gas and oil well packers.

F. P. Waage, Bristol, S. D., has been granted a franchise to install an electric light plant.

Cleveland

CLEVELAND, OHIO, August 26, 1913.

The local machinery market is quiet, but some of the dealers are doing close to a normal volume of business for this season. There is no indication of an early improvement as inquiries are very light. Orders are almost entirely for single tools. The Otis Steel Company has issued a preliminary list that includes about 40 machines for the machine shop to be built in connection with its new steel plant in Cleveland. It is understood, however, that this list was sent out to obtain information as to the approximate cost of the machinery equipment, which will probably not be purchased for some time. Machine tool builders report the demand rather light. Buyers are holding off and are purchasing only such tools as are actually needed. The second-hand machinery market is dull.

The Peters Machine & Mfg. Company, Whitney Power Building, Cleveland, maker of automobile and machine parts, has had plans prepared for a new factory which it will erect shortly. The plant will probably be erected on West Madison avenue, where the company has secured options. The building will be a two-story structure, 62 x 275 ft. The purchase of about $35,000 worth of new machinery equipment is being planned. This will consist largely of milling and chucking machines, grinders and multiple spindle drill presses.

A number of Chicago men are interested in a new company to be known as the Cleveland Spring Company, which has secured a site for a plant on Chestnut avenue. Among those interested in the company are W. S. Kimball and Herbert Rhodes.

The Kouyoumjuan Electric Mfg. Company, now located on East Fourth street, Cleveland, has leased the two upper floors in a factory building on Ashland road and will shortly move to its new and larger quarters which will provide for its growing business. The company makes generators and other electrical products.

The purchasing department of the New York Central Lines in Cleveland has an inquiry out for several machine tools for the Lake Erie & Western Railroad shops in Lima, Ohio. The list includes a 5-ft. radial drill, an 18-in. lathe, a 24-in. lathe, a milling machine and two upright drill presses.

Plans for a group of seven buildings to be erected by the Farr Brick Company, 3325 Independence road, Cleveland, are being prepared by the Forest City Engineering Company, Cleveland. One of the buildings will be used for a machine shop. The machinery equipment will not be purchased for at least 60 days.

Following its recent list of machinery requirements the American Steel & Wire Company placed orders with local machinery houses during the week for a 72-in. King boring mill and a 4-ft. radial drill.

The Broadway Foundry Company, Cleveland, has been incorporated with a capital stock of $10,000 to engage in a general foundry business. The incorporators are William Hutz, Adolph Brach, L. A. Katz and others.

Plans for a new plant to be erected in Toledo, Oh by the Perfection Spring Company, of Cleveland, being prepared by Mills, Rhines, Bellman & Nordh architects, Toledo. The building will be of brick, c crete and steel. The plant will be located on the Mic gan Central Railroad near Manhattan road.

A new plant for the manufacture of brass produc such as jardinieres, cuspidors and novelties, is be established by Ayling & Reichert at 1016 Monr street, Toledo.

The Sanitary Broom Company, 113 West Bancr street, Toledo, Ohio, has taken out incorporati papers, and will add to its present line of brooms t manufacture of hygienic specialties and housek utensils.

The Newark Ohio Tool Company, Newark, Oh has been incorporated with a capital stock of $50,0 by John F. Gero, W. A. Erman, Carl O. Erman a others.

A new boat building and marine repair shop w be built in Lorain, Ohio, by M. W. Schell. It will b located on the east side of the river at the foot Arizona avenue.

Cincinnati

CINCINNATI, OHIO, August 25, 1913.

Several local machine tool builders feel more e couraged as to the outlook for foreign business, a lately a few sporadic orders have been received fro export agents. The railroads are also doing some qui buying of single tools, and the general situation sho some improvement over the previous week. The mol ers' strike has been settled. The foundry operators, a rule, have granted the increase of 25c. a day asked f by the molders. The schedule now established is $3 per day, as against the old rate of $3.25. It is general understood that the teamsters' strike has been a failur While a number of firms in the city proper are suffe ing some embarrassment in deliveries, as well as in re ceiving shipments, before the week is over normal co ditions are expected. Boiler and tank makers, as well a second-hand machinery dealers, both report a slig improvement in business.

The Procter & Gamble Company, soap manufac turer and oil refiner, Cincinnati, has let the contract fo an addition to its plant in Ivorydale suburb. The ne structure will be 160 x 190 ft., three stories and of co crete construction.

The Dayton Engineering Laboratories Company Dayton, Ohio, has acquired a large tract of land adjoin ing its plant, on which will be erected an extensive ad dition. Plans have not yet been made.

The Globe-Wernicke Company, Norwood, Ohio, Cincinnati suburb, has commissioned the Roche-Brune Building Company to erect an addition to its plant t be 75 x 350 ft., two stories, of reinforced concrete co struction. The building will be used for manufacturin purposes.

The National Electric Sign & Mfg. Company, Mans field, Ohio, has been incorporated with $50,000 capita stock, to manufacture electric signs and other novelties E. P. Robbins is named as one of the principal incor porators.

It is reported that the Brightman Mfg. Company Columbus, Ohio, plans to erect a branch plant at Shelb Ohio, to be used for the manufacture of shafting.

The Newark Tool Company, Newark, Ohio, is new incorporation with $50,000 capital stock. John F Gero and William A. Erman are named among the in corporators. The new company will specialize in the manufacture of boiler-making tools.

The L. H. Thompson Mfg. Company, Dayton, Ohio, has been incorporated with $10,000 capital stock, to operate a pattern shop. The incorporators are S. H. Thompson, John C. Barst, T. N. Barlow, C. F. Budroe and A. J. Ehler.

Advertisements for bids on a proposed dam to be built in the Ohio River at Richmond, Ohio, will be issued in a few days by the Cincinnati corps of the United States engineers. In addition to construction material, considerable power-plant equipment will be required.

The Byesville Machine Company, Byesville, Ohio, has taken over the plant of the Hall Gas Engine Company, Byesville, and will make extensive additions at an early date. T. W. Scott is president of the new company.

The muncipality of Blanchester, Ohio, has definitely decided to make some extensive additions to the electric lighting and waterworks plant. Mention of this project was made some time ago.

The Crescent Supply Company, Marietta, Ohio, nufacturer of petroleum products, has let the con- t for a three-story factory, 45 x 150 ft., of brick, with l construction, and an office building. The company ises that the machinery required has not been de- ed upon.

The city of Troy, Ohio, will shortly rebuild its power se, combining the electric power plant and the terworks system. L. A. Pool is superintendent.

Milwaukee

MILWAUKEE, WIS., August 25, 1913.

Reports from machinery manufacturers in this dis- t are becoming more and more encouraging as the ive season advances, and there is a cheerful tone all ng the line. The prospect of some good new busi- s, even though it may be small, together with orders ally booked, has strengthened the basis of opera- s considerably. More men are being added to pay- ls that were somewhat depleted when the slackness ame apparent. For a time it looked as if the milling chine builders might catch up with orders, but new kings have put them behind nearly as much as they re in May and June. The Allis-Chalmers Mfg. Com- y, the largest machinery interest here, has infused spirit into the industry by putting through a plan ereby the Milwaukee works will be considerably en- ged in size and scope and 1000 men added to the roll. e labor situation is good and there is no sign at sent of any trouble.

At the sale of the Wisconsin Engine Company, Cor- , Wis., a suburb of Milwaukee, the property was bid by the bondholders, who now will go out to seek a chaser. The representative of the bondholders was only bidder, and the entire property was sold for 6,030, which is said to be only a fraction of its actual ue. Factory buildings, shops, foundry, all equipment, ls and patterns, together with 238 acres of land, were d in one lot at $120,000 and the stock on hand, fin- ed and unfinished, plus the book accounts and good ll, was disposed of at $6030. The company was ced into bankruptcy in January and the assets were eduled at $750,000, with liabilities of $550,000.

Daniel D. Weschler has organized the D. D. Wesch- Malting Machinery Company, with a capital stock of 000, to manufacture machinery for brewing and lting plants. Mr. Weschler is president of the D. D. eschler & Sons Malting Company, and the new cor- ation plans to build a factory adjoining the malting nt on Burnham street.

The Almond Electric Company, Almond, Wis., has en incorporated for $10,000 and will establish an elec- light and power plant. Oscar Culver, William unker, A. A. Leppes and S. E. Rolf are the incorpo- tors.

An extension of the waterworks system at Burling- n, Wis., has been voted and the total expenditure will proximate $22,000.

At the annual meeting of the Raymond C. Agner mpany, Burlington, Wis., manufacturer of automobile d marine devices and specialties, plans for an enlarged oduction and additions to the line of goods were au- orized. The brass foundry and stamping department ll be increased in size. All officers were reelected d Raymond Agner continues as general manager.

The Milwaukee Concrete Mixer & Machinery Com- ny, Milwaukee, has increased its capital stock from 0,000 to $125,000 and changed its name to the Milwau- e Concrete Mixer Company. The works will be de- ted from now on exclusively to the manufacture of ncrete mixers and the additional stock issue is to ovide funds for increased production and extensions.

Because of the large and growing market for mal- ble castings in Fond du Lac, Wis., local capitalists e interesting themselves in a proposition to form a mpany to establish a malleable iron foundry. Henry Buss is the leader in the movement.

The Common Council of Superior, Wis., has ordered e city engineer to prepare estimates and tentative ans for a municipal machine and repair shops, to serve l city departments, but more especially the fire de- rtment. Preliminary calls would call for a brick ilding, 35 x 140 ft., with full equipment driven by ectrical power.

The Aylward Foundry Company has been organized New Holstein, Wis., to establish a gray-iron foundry hich will serve local and outside gas engine manu- acturers with cylinder and other castings. The organ- ers are E. C. Aylward, John Lauson, H. D. Lauson, eorge L. Levernz and A. A. Laun. The capital stock $30,000.

The Fairbanks-Morse Mfg. Company is preparing for the beginning of operations in its new gasoline engine works which will be part of its Eclipse works at Beloit, Wis. A new building, 192 x 224 ft., two stories, of brick and steel construction, is now being completed. It will be devoted entirely to the production of small gasoline engines, ranging from one to six hp. Machining, erecting, assembling, testing, finishing, etc., will all be done in the new building.

The United Refrigerator & Ice Machine Company, Kenosha, Wis., is adding new equipment and rearranging part of its shops to make possible the production of larger sizes of ice and refrigerating machines. Last week the company entertained its factory and sales representatives. About 50 men spent the week at the works.

F. L. VanEpps has purchased the interest of L. D. Freeland, in the Freeland Steel Tank Company, Portage, Wis. Mr. Freeland established the tank works four years ago. He intends to locate in Canada, probably in the steel and tank business.

Detroit

DETROIT, MICH., August 25, 1913.

Reports indicate an improvement in the demand for machinery. While sales of single tools predominate, a number of transactions are mentioned involving small groups of from three to five machines. Considerable new inquiry is pending in this market, a noticeably large proportion of which is for standard tools. There is also a good demand for electrical and power equipment. Second-hand machinery is moving quite freely. Machinery merchants are inclined to look for continued improvement and expect considerable buying from the automobile industry during the fall.

An important addition to Detroit's manufacturing plants was presaged last week by the announcement by Horace E. and John F. Dodge, of Dodge Bros., manufacturers of automobile parts, that they would enter the automobile manufacturing field. The Dodges have been prominently identified with the Ford Motor Company and have supplied that company with the major portion of its automobile parts. A large tract of land adjoining the present plant in Hamtramck, a Detroit suburb, has been purchased and will be improved with manufacturing buildings. All the plans in connection with the enlargement of the plant are not yet fully matured, but the extensions and additions to equipment will be made from time to time as the market for the new automobile is developed.

The Ford Motor Company, Detroit, at present has under way several extensions to its plant and it is announced that the termination of the company's contract with Dodge Bros. for the supplying of automobile parts, which will take place July 1, 1914, will not immediately necessitate further additions, as the company will have facilities to manufacture a great many of its own parts.

The Cameron Wire Wheel Company, Detroit, has been incorporated with $25,000 capital stock to manufacture wire automobile wheels. Arrangements for the equipment of a factory in this city are being made. A A. Leslie and F. F. Cameron are the principal stockholders.

The Shermack Company,. Detroit, manufacturer of automatic vending machines, has increased its capital stock from $100,000 to $150,000.

The Detroit Oak Belting Company, Detroit, has had plans prepared for a one-story brick power house, 38 x 84 ft., to serve the new factory which the company is erecting.

The Detroit Metal & Steel Works, Detroit, has been incorporated with $18,000 capital stock to manufacture metal articles. Hugh McNeil, James Duross and Wesley F. Lindow are the incorporators.

R. A. Carmichael & Co., Detroit, manufacturing chemists, have increased their capital stock from $50,000 to $200,000 to permit of the enlargement of their plant.

The Gemmer-Detroit Starter Company, Detroit, has been incorporated with $117,500 capital stock to take over the Gemmer Mfg. Company, operated by George A. Gemmer. The company manufactures automobile starting devices.

The Internal Gear Drive Company, Detroit, has been incorporated with $6000 capital stock to manufacture a new type of automobile delivery wagon. Albert Mais is the principal stockholder.

The Swedish Crucible Steel Company, Detroit, is having plans prepared for an addition to its plant in Hamtramck, a Detroit suburb. Details are not yet available.

H. Collier Smith, manufacturer of rotary shears, 807 Scotten avenue, Detroit, Mich., is having plans prepared for an addition, 37 x 100 ft., to his plant. Additional machine equipment to be installed consists of one planer, one plain horizontal milling machine, one 30-in. lathe, one 20-in. lathe, and two 14-in. lathes, driven by electric motor.

The Scotten-Dillon Company, Detroit, has awarded the contract for the erection of a one-story brick boiler house.

The village of Perry, Mich., has voted $15,000 bonds for the construction of a municipal waterworks system. A pump and other machinery will be purchased.

The plant of the Defoe Boat & Motor Works, Bay City, Mich., was totally destroyed by fire August 19, entailing a loss of $9000. The company will resume operations.

The taxpayers of the village of Mesick, Mich., have voted $6000 bonds for the construction of a waterworks system.

The board of public works, Holland, Mich., will receive bids until September 1 for furnishing and installing a 1100-gal. vertical centrifugal pump, direct connected to a vertical motor.

The Lansing Foundry Company, Lansing, capitalized at $100,000 is altering a building recently purchased and will have, when finished, a molding floor 100 x 130 ft. The foundry will be equipped with air hoist traveling cranes, a 10-ton crane, sand blast, a welding department, compressor, power and hand molding machines, bureau style core ovens, fireproof pattern vault and a completely equipped pattern shop. J. H. Moores is president: M. R. Potter, vice-president; M. C. Knight, treasurer; E. H. Wildt, secretary and general manager.

The Central Paper Company, Muskegon, Mich., is building an addition to its plant, 50 x 150 ft., two stories.

John G. Anderson has been appointed receiver of the bankrupt Rodgers Iron Works, Muskegon, Mich. He will continue to operate the plant, which manufactures sawmill machinery, pumps, etc.

The Watervliet Paper Company, Watervliet, Mich., will increase its capital stock from $400,000 to $600,000 and issue $250,000 bonds to provide for the building of additions and extensions to mechanical equipment, which will double its capacity. A new paper machine with an engine and two boilers will be installed; also two new coating machines.

Wheeling

WHEELING, W. VA., August 25, 1913.

Announcement is made by the Whitaker-Glessner Company, Wheeling, W. Va., of the erection of a 40-ft. extension to the annealing house. The Riverside Bridge Company, Martins Ferry, Ohio, has the contract. An additional double annealing furnace will be installed, which will considerably increase the capacity of the department and make it easier to take care of the output of the hot mills.

The Scott Automobile Valve Company, Charleston, W. Va., has been incorporated with a capital stock of $25,000 to manufacture patent gas valves with an automatic safety shut-off device by J. R. Scott, William A. Scott, Harry L. Riggs and others of Charleston, W. Va.

Work has begun at the Thornton Fire Brick Company's property, Grafton, W. Va., preparatory to re-erecting the plant recently destroyed by fire. It is expected that the plant will be in operation October 1. D. L. Potter is general manager.

The Riverside Bridge Company, Martins Ferry, Ohio, has more large contracts on hand than ever before in the company's history. Among these is a new plant for the Owens Bottle Company, of Clarksburg, W. Va., which will be located in the West Indies, probably at Havana, Cuba. The company is now completing and shipping a large consignment of steel for the New York, New Haven & Hartford Railroad, on its contract for steel signal posts for the system.

The galvanizing plant of the Novelty Stamping Company, Bellaire, Ohio, will be moved to Canton, Ohio, following the organization of the American Stamping & Enamel Company, into which the former company was merged.

The Iron City Stove & Foundry Company, Bristol, Va., has purchased the stove foundry of the bankrupt Dominion Iron Works, in the same city, will move to the plant thus acquired, and will start operations at once on a large scale.

The Campbell Brothers Ice Company, St. Albans, W. Va., has been incorporated with $25,000 capital stock, to erect an ice plant. J. M. Campbell is one of the principal incorporators.

The Central South

LOUISVILLE, KY., August 25, 1913.

The trade situation remains satisfactory, and ma chinery men report business to be developing in lar volume than had been expected for this month. I proved crop conditions have stimulated trade in alm every line. The demand for direct-connected, mot driven machine tools is stated by manufacturers sp ializing in that line to be the best ever experienc Ice-machine concerns report that the number of quiries for equipment of this character is record bre ing and that if 50 per cent. of the prospects develop sales they will have all they can do to take care of business. Woodworking equipment is selling w while boilers remain in good demand.

The Helical Shock Absorber Company, Louisvil has been incorporated with $120,000 capital stock by C. Hieatt, Inter-Southern Building, and others, a plans to build a factory. Detailed plans have not been announced.

The Rindt Company, Louisville, has been organiz with $30,000 capital stock and will specialize in the ma ufacture of a self-heating sad-iron. It will take ov the plant and equipment of the Art Brass & Plati Works, Louisville, and will be in the market for a co siderable amount of new metal-working machine There is a possibility of an entirely new plant be erected at some other point. Carl Rindt may be a dressed for further details.

A motor recently destroyed in a fire at the pow plant of the Louisville Railway Company, Campb and Logan streets, will be replaced at once.

The Imperial Wire & Iron Works, Hancock a Jefferson streets, Louisville, has decided on the erecti of a new and larger plant at Twenty-fourth and Ma streets, and Thomas J. Nolan, architect, is now taki bids on the construction of the building. Considerab additional machinery will be needed.

The Highland Garage, 1064 Bardstown road, Lou ville, is building a fireproof machine shop, and w purchase the necessary tools to be used in its repa work in the immediate future.

E. G. Duckwall & Co., 828 South Twentieth stre Louisville, who, as recently reported, are building grain elevator, will need, among other equipme cleaning and dust-collecting machinery.

The Turner, Day & Woolworth Handle Compan Louisville, will purchase six additional lathes for i factory at Beaumont, Texas, operated under the na of the Gates Handle Company. Address the superi tendent at Beaumont.

The Wood Mosaic Company, New Albany, Ind., h definitely decided to rebuild its flooring factory a veneer mill, and will begin purchasing equipment once. W. A. McLean is president and gene manager.

The K-D Cabinet Company, Richmond, Ind., h been incorporated with $30,000 capital stock to ma facture kichen cabinets by W. H. Turner, G. E. Kemp and others.

The fanhouse and other buildings of the Litt Mining Company, Petersburg, Ind., were damaged b fire recently, the loss being estimated at $5000.

The Ohio Valley Electric Railway Company h purchased the plant of the Carpenter Electric Lig & Power Company at Catlettsburg, Ky., and plans use it as a substation. Additional equipment will b required.

The Kentucky Utilities Company, Lexington, Ky is considering the construction of an interurban tra tion line between Somerset and Burnside, Ky. It also considering the purchase of the municipal wate plant at Lawrenceburg, Ky., which, if purchased, w be enlarged and otherwise improved.

The Citizens' Garage, Carlisle, Ky., is enlarging i building and will probably purchase some additiona equipment for its repair shop.

The Paris Ice Mfg. Company, Paris, Ky., has an nounced that the erection of an addition to its buil ing will be begun shortly, and that equipment with tons capacity will be added. The company is als considering erecting a small plant at Carlisle, Ky.

J. W. Kern, Sturgis, Ky., is in charge of plans fo the organization of a company to install waterwor equipment. The estimated cost of the plant is $15,00

The Clay County Lumber Company, Pineville, Ky will install a mill on its timber holdings in Clay Count Ky., in the near future. G. E. Howard, W. W. Eag and others are interested.

A company has been organized at Campbellsvill Ky., to build a water system and an electric light plan Franchises which have granted by the municipality w be purchased by the new company.

The brick manufacturing plant of E. P. Denton, Frankfort, Ky., was burned recently with $5000 loss. Mr. Denton is considering rebuilding.

The city of Henderson, Ky., has definitely decided on the expenditure of $30,000 for equipment for its municipal lighting plant. The machinery to be purchased includes an additional boiler, a turbine and a condenser. Bids are now being received.

The Erlanger Light & Power Company, Erlanger, Ky., has purchased a franchise for the operation of an electric light system at Erlanger, and a power plant will be erected at once.

W. S. VanDalsen, Danville, Ky., is asking prices on equipment for an ice factory and cold storage plant.

John C. Ramey, Paintsville, Ky., is planning the construction of an ice factory.

O. G. Moore, Frankfort, Ky., will rebuilt a flour mill which was recently burned. The cost of the plant will be about $10,000.

The Sacramento Milling Company, Sacramento, Ky., has plans for the installation of additional flour milling machinery.

The Pikeville Ice Company, Pikeville, Ky., has decided upon the enlargement of its plant, according to a recent announcement.

The Fulworth Garment Company, Cincinnati, Ohio, is considering the establishment of a factory at Cynthiana, Ky., for the manufacture of women's clothing.

The Hermitage Hygienic Heating Company, Nashville, Tenn., has been incorporated with $20,000 capital stock and will build a plant for the manufacture of stoves. E. J. Parker and others are members of the company, which has temporary quarters in the Stahlman Building.

The Hoshall-Simmons Company, Randolph Building, Memphis, Tenn., is in the market for a second-hand rotary machine for the manufacture of veneers.

H. H. Hughes, Nashville, Tenn., has announced plans for the construction of a grain elevator of considerable capacity.

The Dyersburg Hoop Company, Dyersburg, Tenn., whose plant was recently burned, has announced that it will rebuild at once.

Work on the new plant of the American Aluminum Company, Maryville, Tenn., is being pushed, recent reports indicating that the construction of a power line from the plant of the Tennessee Power Company will soon be begun.

The Fletcher Mfg. Company, Nashville, Tenn., has begun the construction of a factory for the manufacture of furniture. The woodworking equipment will be individually motor-driven. Address Eugene H. Fletcher.

The North Carolina College of Agriculture and Mechanic Arts, West Raleigh, N. C., has awarded contracts for the erection of several buildings, to be equipped with machinery at present owned and a forge shop, 35 x 75 ft., which will require new equipment.

The Porter Cotton Oil Company, Birmingham, Ala., plans to erect a plant for refining cotton oil. The company has a capital stock of $10,000. L. M. Porter is president of the company.

The city of Tuscaloosa, Ala., is considering the construction of a $6000 incinerator.

St. Louis

ST. LOUIS, MO., August 25, 1913.

Conditions in the machine tool trade have shown some slight improvement the past week, as the crop reports show that the damage to the corn area will not seriously affect the financial power of the districts, owing to the abundance of other crops. In addition, belated rains are expected to save a portion at least of what was regarded as lost. Demand during the week has been for a slightly larger number of tools from the outlying territory, while the local request has shown some betterment. In the agricultural implement trade there has been a notable activity, indicating that purchasing ability is still existent. Collections are reported fair.

The Stanard-Tilton Milling Company, St. Louis, has awarded a contract to the Macdonald Engineering Company, of Chicago, for the construction at Dallas, Texas, of a flour milling plant, which will cost more than $500,000 to complete. It will have a capacity of 2500 barrels of flour daily and the power and operating equipment will cost in excess of $125,000. An elevator of 500,000 bushels capacity will be erected. Internal combustion engines of 1000 hp. in all will be used.

The South St. Louis Lumber Company, St. Louis, has been incorporated with a capital stock of $35,000 by L. J. and H. J. Ganahl and others, and will install a planing mill and other equipment at once.

The Golden Grain Milling Company, of East St. Louis, incorporated recently with $100,000 capital, has broken ground for a horsefeed plant at East St. Louis, which will cost, with equipment, about $100,000. C. B. Williams, St. Louis, is the principal local official.

The Big Four Railroad has begun the construction of a roundhouse at East St. Louis, to cost about $25,000, and will add shop equipment upon completion. Other buildings will be added later, the total cost to be about $250,000.

The Stiesbach-Anderson Mfg. Company, 1917 Belmont avenue, East St. Louis, Ill., manufacturer of store fixtures and other mill work, is expending about $20,000 for a plant. Address Theodore Anderson, secretary.

The Banner Buggy Company, St. Louis, has plans for the installation of additional equipment for the manufacture of vehicles, to cost about $100,000.

Plans are being prepared by G. F. A. Brueggemann, St. Louis, for the Warwick Hotel at St. Louis, which it is intended shall have independent lighting, heating and ventilating equipment.

The Mercantile Tie & Timber Company, Kansas City, Mo., has been incorporated with a capital stock of $10,000 by U. S. Epperson, H. A. Thompson and Henry W. Jacques to engage in the tie and timber business. The company intends to install mills.

The Thorp-Allen Motor Company, Kansas City, Mo., has been incorporated with a capital stock of $10,000 by William R. and H. B. Thorp and H. L. Allen, and will equip a motor car repair plant and garage.

The supervisors of the Elsberry Drainage District in Missouri will do about 1,500,000 cu. yd. of excavation. Machinery is being sought for the work. The Harman Engineering Company, Peoria, Ill., is in charge.

A band and resaw sawmill will be built at Deering, Mo., by the Wisconsin Lumber Company, of Chicago. F. R. Gadd is vice-president.

The Graselli Chemical Company, of Joplin, Mo., and Cleveland, Ohio, has plans for equipping and developing mineral property which it has leased near Sarcoxie, Mo.

The Napoleon Elevator Company, recently incorporated at Napoleon, Mo., with $10,000 capital stock, has begun erection of its building, but has not completed its machinery plans. G. F. Oberhelman is president, and A. F. Wegener, treasurer and manager.

The city of Dexter, Mo., has completed the legalization of its $53,000 bond issue for waterworks and sewer system. Frank L. Wilcox, Chemical Building, St. Louis, will prepare the plans.

The William Jewell College, Liberty, Mo., has plans for a science building to cost about $200,000, including the necessary mechanical and scientific equipment.

A waterworks plant will be built at Golden City, Mo., with $12,000 bonds, whose issue has been formally authorized.

Maitland, Mo., has voted bonds for a waterworks system to cost about $15,000.

The Singer Mfg. Company, Truman, Ark., is having its plant rebuilt and new additions made at an estimated cost of $60,000. The contract has been awarded to C. H. Harp, Cairo, Ill.

The Canfield Gin Company, Canfield, Ark., has been incorporated with $10,000 capital stock by Milton Winham, J. B. Burton and P. D. Burton to equip a cotton ginnery.

A cotton gin is to be built at Little Rock, Ark., by S. J. Hilton, with equipment to cost about $6000.

A saw gin has been decided upon by Grumbles & Thomas at Star City, Ark., recently announced as planning a cotton gin plant. Equipment to cost $4000 will be installed.

The Joiner Gin Company, of Joiner, Ark., has been incorporated by S. Rolph, D. N. White, J. W. Drake and others with a capital stock of $6000 and a gin will be installed at once.

The Danville Electric Company, of Danville, Ark., will increase its boiler capacity and probably add some electrical equipment.

An electric light franchise has been granted to L. P. and W. J. Caldwell by Newark, Ark. Plans for the immediate construction of a plant have been announced.

The Norton Company, Worcester, Mass., has plans for a $25,000 bauxite plant at Bauxite, Ark. J. Felton Gibbons is the Arkansas agent.

The American Stone Company, Floyd's Knob, Ind., is in the market, it is announced, for the necessary equipment for its whetstone plant to be constructed at Butterfield, Ark., at once.

The Welch Stave Company, Welch, La., has acquired large acreage at Brownsville, Ark., and will equip a stave plant.

The city of Medford, Okla., will rebuild the electric light, water and power plants which were burned recently. The machinery was damaged to the extent of $12,000.

The Soper Electric Power Company, Soper, Okla., has been incorporated with a capital stock of $14,500 by A. J. Steen, W. F. Breathwit and James Breathwit, and will equip a plant soon.

The J. S. Wylie Company, Oklahoma City, has been incorporated with a capital stock of $10,000 by J. S. Wylie, S. K. Bernstein and Gunnell Moore, and will equip a machine shop.

A plant for the manufacture of Kaffir corn threshers will be equipped soon at Oklahoma City, Okla., by D. A. Radle, of Elk City, Okla., and J. R. Thompson, of Vinson, Okla.

A waterworks plant to cost about $25,000 will be installed at Forgan, Okla., W. C. Swanwick & Co., of Joplin, Mo., are the engineers in charge.

The Leflore Compress & Storage Company, Greenwood, Miss., has been incorporated with a capital stock of $75,000 by B. B. Provine, S. F. Jones and P. A. Malone, and will equip a cotton compress, etc.

The Evansville Gin Company, Evansville, Miss., has been incorporated with a capital stock of $13,500 by W. T. Brewer, Albert Coopwood and others, and will install ginnery equipment.

The city of Baton Rouge, La., is planning the construction of an electric light plant and a garbage incineration system.

The J. G. Rainwater Lumber Company, New Orleans, La., has been incorporated with a capital stock of $25,000 by J. G. and I. S. Rainwater and John M. Upton, and will equip a mill.

The Belle Helene Co-operative Sugar Company, Donaldsville, La., has been incorporated with a capital stock of $50,000 by Joseph Staring, C. D. Gondran and I. Picard, and has acquired a plant which it will remodel and re-equip before beginning operations.

A sewer system, including considerable mechanical equipment, and which will cost about $100.000, will be installed at McComb, Miss. Xavier A. Kramer, of Magnolia, Miss., is engineer. Similar plans for New Iberia, La., are in the hands of the same engineer.

The Hammond Box & Veneer Company, Hammond, La., has plans for a considerable increase in its mechanical equipment.

Arrowsmill & Wilmot, Roseland, La., have started the construction of a building which will be equipped for the manufacture of veneers. Power and special equipment will be needed.

Texas

AUSTIN, TEXAS, August 23, 1913.

Building trades and business generally are keeping up remarkably well all over the State. Rains have improved cotton crop prospects. Much attention is being given to the promoting of interurban electric railroad projects in different parts of Texas. This movement, which had the territory around Dallas as the scene for its early operations, has extended to southern Texas, and th econstruction of two or more lines out of Austin will soon be in progress, it is stated.

The commercial club of Terrell is urging the City Council of that city to take steps toward increasing the municipal water supply. It is planned to construct a dam and create a large water storage reservoir. A pumping plant will also probably be installed.

The Midway Creamery Company has been organized for the purpose of erecting a creamery, ice factory and ice-cream factory at Midway. W. F. Sikes, of Buffalo, N. Y., is at the head of the project.

An agreement is pending between the City Commission of Fort Worth and the Fort Worth Power & Light Company whereby the latter is to pump the city's water supply. Under the proposed contract the company is to furnish all pumps, air compressors and motors necessary for the work.

The Mexia Light, Water & Sewerage Company is preparing to equip its pumping plant, situated six miles north of Mexia, with electric power.

The Brown Fig Company will construct a plant at Figridge for manufacturing tin cans for use in its fig preserving factory at that place.

Plans for the extensive shops which the Southern Texas Traction Company will erect at the new town of Monroe are now being prepared.

Komer & Co. will erect a cotton gin at Pottsboro.

The City Council of Teague has under consideration the matter of augmenting the municipal water supply. Additional wells will probably be bored.

The City Commission of Fort Worth has sold the issue of $300,000 bonds for the completion of the waterworks system, recently voted.

Johnson, Logan & Co., who recently brought in a natural gas well near Mexia with an estimated capacity of 8,000,000 cu. ft. of gas per day, will pipe the fuel to towns of that section. They will also bore additional wells.

The City Commission of Marshall has granted the Marshall Traction Company a new franchise for its street railroad system. The same interests are preparing to enlarge the electric light and power plant which they own.

The Crisp Press Brick Company has been organized at Crisp, Texas, for the purpose of erecting a brick manufacturing plant. It has a capital stock of $30,000. W. F. Allen, Ben Allen and J. P. Sims are the incorporators.

Samuel J. Smith, Beaumont, has purchased a site for the erection of a new plant to cost $25,000, which will be utilized for the manufacture of wooden boxes.

The Pacific Coast

SAN FRANCISCO, CAL., August 19, 1913.

The machinery market is still in a waiting condition, and large single orders are scarce. A few fairly good groups of machine tools have been sold in the last fortnight, but most dealers report business dull, with little inquiry from the usual sources. The lists in preparation at the navy yard, however, offer some encouragement, and good orders in other quarters are expected at any time. Some local shops are said to be busier than for several years, but all hesitate to buy equipment until the future is better assured. Woodworking and general contractors' machinery, steam shovels, industrial railroad equipment, etc., are all extremely quiet, owing entirely to the tightness in the money market. Travelers returning from the Southwest, as far as New Mexico, report similar conditions. There is a little more cheerful sentiment locally, based largely on crop returns and an apparent improvement in building conditions, but no material improvement is expected until money becomes more readily available. A few particular lines continue to move well, pumping equipment being among the most active.

The principal order recently placed is from the Southern Pacific Company, and includes a 26-in. traveling head shaper, a 30-in. lathe, a 32-in. drill press and a 2-in. bolt cutter.

The Yuba Construction Company, Marysville, Cal., has placed an order with Harron, Rickard & McCone for a four-ft. radial drill, a 20-in. shaper, a two-in. bolt cutter and a hack saw. The Yuba Construction Company has just completed shipment of a large dredging outfit to the Philippine Islands and two to Idaho.

The Machinery & Motor Exchange, of Los Angeles, Cal., has been incorporated with a capital stock of $10,000 by C. E. Shaul, T. E. Smith, M. Wantoch, A. Schaffer and R. J. Gardner.

The California Iron Works, San Diego, is about ready to start work on a new plant on tidelands at the foot of Seventh street.

The Santa Barbara Gas & Electric Company, Santa Barbara, Cal., is installing a new boiler, steam turbine and other equipment.

The town of San Rafael, Cal., has voted $50,000 bonds to build a garbage incinerator and a street repair plant.

Work has been started on the enlargement of the California-Hawaiian Sugar Company's plant at Crockett, Cal., the capacity of which will be doubled, bringing it up to 400,000 tons annually.

Los Angeles County is considering the purchase of a steam shovel for road work.

The pattern department of the Pioneer Boiler & Machine Shop, Los Angeles, was destroyed by fire recently, with a loss of about $10,000.

It is announced that the Western Electric Company will shortly establish a large shop and supply department in Oakland.

The Lewis Motor Truck Company, San Francisco, has secured additional capital, and is preparing to enlarge its scale of operations.

The Pacific Metal Products Company, Los Angeles, has increased its capital stock from $500,000 to $1,500,-

000, and is preparing to engage in the manufacture of motor trucks.

Totten & Brandt, whose planing mill at Stockton, Cal., was recently burned, are installing new equipment.

The Peoples Water Company is preparing to equip its pumping station at Richmond, Cal., for electric power.

The town of Healdsburg, Cal., has ordered a new waterworks pumping outfit.

L. J. Ross, representing the Universal Fibre Gin Company, is at Imperial, Cal., to supervise the construction of a large ginning plant.

The city of San José, Cal., is preparing to install a garbage incinerator.

The West Coast Floating Drydock Company has been organized at San Diego, with a capital stock of $1,000,000, by Felix James, Fred L. Gurgan and others, to build and operate a floating drydock.

The North End Water Company, Brawley, Cal., is preparing to buy a dredge.

Eastern Canada

TORONTO, August 25, 1913.

The Vincent Steel Process Company, Detroit, has let contracts for the construction of a Canadian branch factory at Windsor, Ont.

The Dusbane Mfg. Company, Ottawa, Ont., will erect a factory building, 60 x 120 ft., two stories, on Sussex street.

H. C. Hocken, chairman of the Board of Control, Toronto, is receiving bids for furnishing and installing three automatically controlled motor-driven centrifugal sewage pumps.

The Mond Nickel Company, Coniston, Ont., has placed the contract for the construction of a sintering plant with the Riter-Conley Mfg. Company, Pittsburgh, Pa.

W. R. Perrin, consulting architect and engineer of the civic abattoir, Toronto, has been awarded the contract for supplying the interior fittings and machinery for the abattoir. His tender was $108,376. Eight groups of tenders were invited, most of the bids being from the United States.

The Sherbrooke Machinery Company, Ltd., Sherbrooke, Que., has obtained the contract from the Abitibi Pulp & Paper Company, Ltd., for its entire equipment of wet machines, penumatic savealls and screens, besides orders from the same company for 12 improved centrifugal screens.

The first annual meeting of the Nova Scotia Carriage & Motor Car Company, Ltd., Amherst, N. S., was held recently. The following board of directors was elected: Senator Curry, D. C. McKay, J. H. Douglas, Percy C. Black, H. W. Wentzell, John W. Regan, M. G. Winter, Hector McInnes, George T. Douglas, C. S. Sutherland, W. H. Tennant and D. A. Morrison. A subsequent meeting of the directors authorized final completion of the new plant and removal of all operations from Kentville to the Amherst plant. It was stated that the Canadian Car & Foundry Company and the malleable works at Amherst are in a position to furnish every kind of forging required for motor car construction.

Damage estimated at $20,000 was caused at Bridgeburg, Ont., by fire, which destroyed the planing mill of O. C. Teal. The loss is partly covered by insurance.

Mallinckrodt Chemical Works, Ltd., Montreal, has been incorporated with a capital stock of $100,000 by J. W. Blair, C. A. Hale, R. W. Gibb and others.

The Fisher Motor Company, Ltd., Walkerville, Ont., has been incorporated with a capital stock of $150,000 by C. F. Garaghty, F. E. Fisher, F. W. Vollans and others to manufacture automobiles, machinery, etc.

The Autographic Register Company, of Canada, Ltd., Montreal, has been incorporated with a capital stock of $150,000 by C. J. Swaim, J. S. Swaim, Robertson Fleet and others to manufacture autographic registers.

Fire has destroyed the Rideau Shoe Mfg. Company's plant at Maisonneuve, Que. The loss is estimated at $125,000, fully covered by insurance.

The Kensington Furniture Company's plant at Goderich, Ont., has been completely destroyed by fire. The loss is $40,000, mostly covered by insurance.

The plans for the workshops of the National Transcontinental Railway at St. Malo, Que., are on exhibition at the engineer's office. Tenders are to be called for September 1.

Aurora, Ont., has voted $16,000 bonds for the purchase and installation of electrical machinery.

Western Canada

WINNIPEG, August 23, 1913.

Announcement is made that one of the three terminal elevators that the Canadian Government proposes to build in the West is to be located at Calgary, Alberta. The structure will have a capacity of 3,500,000 bu. and will cost in the neighborhood of $1,500,000.

J. F. Conley, of the Conley Frog & Switch Company, Memphis, Tenn., is arranging to establish a branch in Port Arthur, Ont. According to the agreement the initial cost of the plant is to be at least $50,000. The company will receive from the city a cash bonus of $25,000 upon the completion of the plant and a lease of 10 acres of land, with sufficient water front to provide for dockage facilities.

At a meeting of the City Council an agreement was read between the city of Medicine Hat and the Western Threshing Machine Company. The city will make the usual concessions of a free site, free gas and water. The company is capitalized at $100,000, and work will be started on the manufacture of threshing machines as soon as possible. J. E. Davies is president, V. W. Parrish, secretary, and H. B. Yuill, treasurer.

Forty-six elevators will be constructed in Alberta in time to handle this year's crop by the Alberta Farmers' Elevator Company, which is closely allied to the United Farmers of Alberta and the Grain Growers' Grain Company, of Manitoba. The work is well under way at the various locations. For the erection of these elevators 46 local companies have been formed in various grain centers.

The Manitoba Engines, Ltd., Brandon, Man., is working at full pressure, and the rush of business is so large that orders have had to be refused.

C. H. Boyd, of Moose Jaw, president of the Canadian Faced Brick Process & Machine Company, Ltd., contemplates the erection of a plant at Brandon, Man., for making a patent water-proof brick.

Blairmore, Alberta, has voted $15,000 bonds for a waterworks system.

Duncan, B. C., has voted $65,000 bonds for electric light and power, and $25,000 for waterworks.

Government Purchases

WASHINGTON, D. C., August 21, 1913.

Bids will be received by the Engineer Depot, United States Army, Washington Barracks, D. C., until September 8 for furnishing four motor-driven, vertical, centrifugal pumping sets.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until September 16, under schedule 5797, for a screw-cutting engine lathe for Philadelphia; under schedule 5800, for molding machines for Portsmouth; under schedule 5804, for a pipe-threading and cutting-off machine and electric hoists for Washington; until September 9, schedule 5775, for turbine gearing and casing; until September 30, schedule 5801, for an automatic steam-towing machine, for Mare Island, until September 30, schedule 5813, for a high-pressure, steam-driven air compressor for Mare Island, and under schedule 5814, for a welding and cutting outfit for Mare Island.

The following bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, August 19, for supplies for the navy yards as follows:

Schedule 5666—Steam Engineering

Class 51, Mare Island—One positive pressure blower—Manning, Maxwell & Moore, $890 and $1233; C. H. & F. M. Roots Company, $1132.25; B. F. Sturtevant Company, $998.

Class 51, Alternate—One positive pressure blower, f.o.b. works—Manning, Maxwell & Moore, $735 and $1083; C. H. & F. M. Root Company, $946.45; B. F. Sturtevant Company, $838.

Class 52, Mare Island—One motor-driven tumbler—Whiting Foundry Equipment Company, $540.

Class 52, Alternate—One motor-driven tumbler, f.o.b. works—Whiting Foundry Equipment Company, $450.

Schedule 5676—Ordnance.

Class 51, Washington, D. C.—One five-ton crane—Exeter Machine Works, $1730; Whiting Foundry Equipment Company, $2920; Niles-Bement-Pond Company, $2095; Pawling & Harnischfeger, $2075.

Schedule 5711—Steam Engineering

Class 21, Norfolk—One motor-driven, spiral disk grinder, complete—C. H. Besly & Co., $980; Gardiner Machine Company, $727.50; Manning, Maxwell & Moore, $1058, $980, $1080 and $695; Swind Machinery Company, $872.

The following bids were received August 18 by the depot quartermaster, New York City, under Schedule 459, for two motor-driven, direct-expansion, ammonia refrigerating compressors: Brunswick Refrigerating Company, $2239 for all, three to five weeks; Remington Machine Company, $6100, or $5300 if piping be not included, 60 days; the Vilter Mfg. Company, $3510, 60 days; William E. Williams, $2004, 60 days.

Trade Publications

Conveying Apparatus.—Dodge Mfg. Company, Mishawaka, Ind. Bulletin D-Z-25. Lists the various types of Dodge-Zimmer conveyors which are made for the economical transportation of raw, finished and waste materials. After a brief introductory description of the conveyor and its method of operation, views are given of a number of different types for handling lime, molding sand, ore, crushed stone, coal, flue dust, etc. A brief description of one of these outfits installed in a gas plant for handling coal and coke is also included.

Blowing Engine Valves.—Mesta Machine Company, Pittsburgh, Pa. Bulletin H. Describes a new type of valve for blowing engine, which was illustrated in *The Iron Age*, May 29, 1913. The valve is of the annular type and consists of a single steel plate which is guided by a volute spring, the latter also furnishing the small force which is necessary to start the closing motion of the valve. A number of views of the various parts of the valve, together with the company's blowing engine and air heads equipped with them, are included.

Ball Bearing.—Hess-Bright Mfg. Company, Philadelphia, Pa. Two data sheets. One is concerned with an adjustable mounting for an automobile bevel driving pinion and gear, while the other refers to the use of ball bearings on the vertical spindle of a matching machine. Views of both applications are given, together with a brief description of the various features involved.

Steel Shafting.—Bliss & Laughlin, Harvey, Ill. Price list. Gives in a handy and compact form a list of the material which this firm manufactures and also the standard classifications and extras of other material, with tables of weights and information frequently required by users and buyers of steel. To facilitate the finding of any desired price list or reference table, a thumb index is employed.

Air Gun.—William Powell Company, Cincinnati, Ohio. Folder. Points out the various uses of an air gun in the foundry; machine, blacksmith and pattern shops; garages and mills and factories of various types. A view of the valve used with this gun is given, together with the different types of tips which can be furnished. Directions for using the gun are included.

Chucks.—Garvin Machine Company, Spring & Varick streets, New York City. Circular No. 195. Contains illustrations and dimensions of wrenchless chucks and also operating forms for Garvin turret machinery. These chucks include the stop and open type, with air and spring treadle control in both standard and modified forms, adjustable, non-adjustable, rocker and index chucks. The air cylinder equipment, which is made in both single and double acting types, is briefly described, and views are given of the various machine tools equipped with the chucks. An illustrated description of these chucks appeared in *The Iron Age*, March 9, 1911.

Oil Separators.—Harrison Safety Boiler Works, North Philadelphia Station, Philadelphia, Pa. Section C of catalogue No. 550. The introduction to this pamphlet contains interesting information regarding the removal of cylinder oil from exhaust steam for the purpose of rendering the latter suitable for heating water by direct actual contact in open heaters or for use in heating or drying systems where the condensate is to be employed for boiler feeding without danger to the boiler. The bad effects produced by the presence of an oily emulsion in the water are touched upon, and the remedy recommended is that the oil be removed from the steam before condensation by oil separators so constructed as to divert the stream of emulsion which flows along the bottom of the exhaust pipe into a well that the steam current does not enter, and also to intercept flying drops or particles carried by the steam current itself. Various applications of separators and the manner of using them in connection with heating systems, paper and textile mills and ice plants, etc., are also discussed.

Punch Press Brake.—Rockford Iron Works, Rockford, Ill. Folder. Lists the advantages of using a patented automatic brake which is applied at the top of the stroke only, so that the flywheel is not required to operate the press under the heavy friction load of the brake. A brief illustrated description of the brake as applied to one of the company's standard power presses appeared in *The Iron Age*, December 5, 1912.

Leather Belting.—Fisher Leather Belting Company, Inc., 221 North Third street, Philadelphia, Pa. Three pamphlets. Call attention to a line of water, oil and weather proof leather belting. In all of the pamphlets mention is made of various repeat orders which have been placed and a number of testimonial letters are reproduced.

Drill Bit Sharpening Machine.—Ingersoll-Rand Company, 11 Broadway, New York City. Form No. 62, entitled "A Question of Drill Bits." Discusses the effect of the condition of drill bits upon the general efficiency of a rock drilling plant and points out the advantages of machine sharpening as compared with the hand method. Brief descriptions with condensed specification tables are given for two types of drill sharpening machines and an oil furnace for heating the steel, the text being supplemented by illustrations. Views of practically all of the standard types of drill steel now in use are included.

Power Plant Equipment.—Schutte & Koerting Compa Philadelphia, Pa. Pamphlet. Pertains to a line of power p equipment that includes injectors, eductor and multi-jet condens spray nozzles for cooling the water of condensation, valves various types, furnace blowers and chimney ventilators and system of firing oil which does not use either steam or air atomization. All of the different appliances are illustrated briefly described, and in a number of cases partial lists of users also included.

Lead and Tin Lined Iron Pipe.—Lead Lined Iron P Company, Wakefield, Mass. Pamphlet. Calls attention to a few the prominent users of these pipes for which the special advanta of freedom from rust and corrosion and a long life are claim The lining is soldered on the pipe and cannot be separated bending, rough usage or hot water. A partial list of the wa works using this pipe, together with the amounts installed in ea case, are included.

Gyratory Foundry Riddle.—Great Western Mfg. Compan Leavenworth, Kan. Circular. Illustrates and briefly describes Comb's gyratory foundry riddle, an illustrated description of wh appeared in *The Iron Age*, May 22, 1913. This riddle is driv by electric motor and is readily portable, as it weighs less than lb. The riddle can be hung from anything that will support weight in any part of the building or yard, and the electric curre is led to the motor from the nearest electric light socket through ordinary lamp cord.

Autogenous Welding.—Economy Welding Machine Co pany, Southwest boulevard and Central street, Kansas City, M Pamphlet. Treats of the various repairs which can be made by t autogenous welding process and shows a number of them. A vie of the machine, which was illustrated in *The Iron Age*, Novembe 9, 1911, is given, and a number of extracts from testimonial lette are also included.

Grates and Furnace Blower.—Donegan & Swift, 6 Mo ray street, New York City. Two pamphlets. Relate to a clinke crushing grate of the shaking type and rocking and stationa dumping grates and a steam furnace blower. The different types grates are all illustrated with a number of line drawings showi the arrangement of the various parts. The blower, which is steam ejector type, is illustrated and described at some length, an a number of views of it as applied to different types of boilers a included.

Locomotive Cranes.—Brown Hoisting Machinery Compan Cleveland, Ohio. Catalogue K. Deals with the company's locomoti cranes equipped with a grab bucket. A general description of crane of various capacities is given, followed by a number of views sho ing how the cranes are used in connection with the builder's patente grab buckets. Mention is made of the bucket itself, and clearan diagrams for an eight-wheel, 15-ton locomotive crane and a fou wheel, 10-ton locomotive crane are included.

Bolts and Nuts.—Kansas City Bolt & Nut Company, Kansa City, Mo. Catalogue No. 813. Covers a complete line of bolts, nu and screws, including track, machine, blank, carriage, plow an stove bolts, coach and lag screws, railroad and boat spikes an nuts of various types. All of these are illustrated, and tables of th sizes and weights which can be supplied are given. Mention is als made of various other products of the company, which include railroad and structural work forgings, turnbuckles, washers and rivets. Tables of the weights of iron and steel shapes are included and a comprehensive index renders the finding of any article a com paratively simple matter.

Heat Treating and Annealing Furnace.—Garrett-Tilley Company, Inc., 90 West street, New York City. Bulletin No. 41. Describes and illustrates an over-fired furnace for heat treating and annealing steel, brass, copper, silver, aluminum, etc., where a uni form and controllable temperature is desired. Views of the furnace with the door raised and lowered are given. These furnaces may be operated with either fuel oil, natural gas, water gas or producer gas, and may be built as a combination furnace to burn any two of the above-named fuels. Mention is also made of other of the com pany's products, such as a line of small accurate temperature fur naces for heat treating small articles and annealing and case hard ening furnaces for coal or coke fuel.

Solving Manufacturing Problems.—Providence Engineering Works, Providence, R. I. Folder. Calls attention to the service which this firm is prepared to offer to manufacturers of machine tools and fixtures. Among the various parts which this company is prepared to manufacture are all kinds of automatic screw machine work and the making of tools, jigs and fixtures, as well as the building of internal combustion engines. In addition to the manufacture of machine parts, the engineering staff is prepared to investigate manufacturing problems and suggest solutions of them.

Marking Crayons.—Zelnicker Crayon Works, St. Louis, Mo. Folder. Calls attention to a line of crayons for marking lumber, logs, iron, steel, etc., and for general purpose work. In addition to these crayons, mention is also made of a checking crayon and one made from soap stone. Reproductions of the wrappers of the various crayons are given, together with a list of the sizes and colors in which they can be furnished.